

VEW APPLICATION



RECEIVED

Er Charace

Attachments:

To: Arizona Corporation Commission Office of 12 P 3: Date: Railroad Safety

Attn: Chris Watson

1200 W. Washington Street

Phoenix, AZ 85007

Arizona Corporation Commission Subject:

Application for UPRR Roadway Crossing

at Recker Road (UPRR Folder No.

2538-74)

RR-03639A-09-0393

Project: Recker and Williams Field Road Improvements

Project Number:

From: Robert Lyons, P.E.

August 5, 2009

Arizona Corporation Commission DOCKETED

AUG 1 2 2009

1) 8 ½"x11" conceptual arawing 55

2) Construction cost estimate of grade separated crossing

3) Executed agreement between Town of Gilbert and UPRR dated 4/16/09

4) Cooley Station Traffic Impact Study by TASK Engineering

Town of Gilbert CIP ST095 AZTEC Project No. AZE0703

UPRR Folder No. 2538-74

This memo is submitted to the Arizona Corporation Commission (ACC) as an application to request an upgrade to an existing Union Pacific Railroad (UPRR) crossing, on behalf of the Town of Gilbert. Below is information based on the most current ACC application instructions.

1. Location of crossing

The project improvements include widening Recker Road to a four lane roadway with a 16-foot wide raised median across the UPRR right-of-way. The UPRR and Recker Road crossing is approximately 2770 feet south of the Williams Field Road centerline. Representatives from the ACC, UPRR, Town of Gilbert, and consultants attended a field meeting on August 27, 2007.

2. Why the crossing is needed

The railroad crossing at Recker Road is an existing two lane crossing. Projected traffic volumes on Recker Road require the addition of more lanes on Recker Road. This project includes widening of the existing crossing.

3. Why the existing crossing cannot be grade separated

With the proposed improvements to Recker Road, the location of the at-grade crossing remains unchanged. A grade separation would have the following consequences: 1) Impact to 69kV and 230 kV overhead power lines currently running parallel to the railroad; 2) Impact to underground utilities in Recker Road that cannot support 30 feet of additional embankment needed for a grade-separated crossing. Among these utilities are a critical 42-inch reclaimed waterline, a 16-inch reclaimed waterline and a 24-inch high pressure natural gas line; 3) There is insufficient right-of-way to accommodate the 30-foot high embankment slopes along Recker Road; 4) There is inadequate distance between the railroad and the Higley Unified School District entrance (approximately 550 feet south of the tracks) to raise the roadway grade over the railroad without violating sight-distance requirements; 5) Grade separating the crossing would eliminate private access to Recker Road for 600 to 700 feet north of the tracks; and 6) Elevating Recker Road would cause visual and noise impacts to the adjacent land uses, which include residential.

4. Type of warning devices to be installed

The warning devices for north bound and south bound traffic included in the design are as follows: gates with flashing lights will be installed outside the roadway near the sidewalk; cantilever flashing railroad signals will be installed outside the roadway near the sidewalk; railroad crossing warning signs will be placed per MUTCD, Part 8 standards; and the UPRR equipment shed will be relocated.

5. Type of warning devices currently installed at crossing

The warning devices currently installed at the crossing include gates with flashing lights located outside the existing roadway. These will be removed by UPRR when they install the new warning devices described in question 4 above.

6. Who will maintain the crossing warning devices

UPRR will own and maintain the physical elements of the crossing (crossing surface, gates, flashing lights). The Town of Gilbert will own and maintain the approaching roadway surface, signing and pavement markings on Recker Road.

7. Who is funding the project

The Town of Gilbert is funding this project.

Below are responses to additional questions that may also be requested by the ACC:

8. Provide average daily traffic counts for this location.

Existing (2008): 8,614 vehicles per day, from the Town of Gilbert traffic count web page,

http://www.ci.gilbert.az.us/traffic/counts08.cfm

2025: 17,170 vehicles per day (August 16, 2006; revised November 16, 2006,

Cooley Station Traffic Impact Study, by Task Engineering.)

9. Please describe the current level of service (LOS) at this intersection, and what the LOS will be with the proposed alterations to the intersection.

Current LOS: B/C Proposed LOS: B/C

10. Provide any traffic studies done by the road authorities for each area.

Task Engineering prepared the August 16, 2006; revised November 16, 2006, Cooley Station Traffic Impact Study. This report is attached to this memo.

11. Provide distances in miles to the next public crossing on either side of the proposed project location. Are any of these grade separations?

The next roadway crossing to the northwest is at Williams Field Road, which is an at-grade crossing, located approximately one mile from the Recker/UPRR crossing.

The next roadway crossing to the southeast is at Pecos & Power Road intersection, which is an atgrade crossing, located approximately one mile from the Recker/UPRR crossing. The Pecos Road crossing was recently improved as well.

12. How and why was grade separation not decided on at this time? Please provide any studies that were done to support these answers.

The Town's design consultant evaluated the impacts and estimated costs associated with a grade-separation. The items listed in response to Question No. 3 support the request to improve the existing at-grade crossing at this location.

In addition, the following economic items (http://www.fra.dot.gov/us/Content/817, page 35) were considered:

Potential Economic Benefit	Response
Eliminating train/vehicle collisions (including the resultant property damage and medical costs, and liability)	As May 31, 2009, no accidents have been reported at this crossing over the last 20 years per the Federal Railway Administration website, http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/gxrtop50.aspx .
Savings in highway-rail grade crossing surface and crossing signal installation and maintenance costs	This would not be a significant savings because the surface and signal work is about \$1M compared to about \$30M for a grade separation.
Driver delay cost savings	Based on 1 mile of train, 6 times per day, at 45 mph, driver delay cost savings would be relatively minor (average delay time is 1.3 minutes).
Costs associated with providing increased highway storage capacity (to accommodate traffic backed up by a train)	Storage capacity required for the railroad has not been evaluated and therefore costs savings cannot be determined.
Fuel and pollution mitigation cost savings (from idling queued vehicles)	Based on 1 mile of train, 6 times per day, at 45 mph, fuel and pollution mitigation cost savings would be relatively minor.
Effects of any "spillover" congestion on the rest of the roadway system	Spillover congestion may impact northbound and southbound queues through Higley Unified School District Driveway and the Chaparral Elementary Driveway. Spillover congestion may also impact Frye Road and the future Somerton Blvd.
The benefits of improved emergency access	See response to question 18.
The potential for closing one or more additional adjacent crossings	Adjacent streets Williams Field Road and Power Road cannot be closed because they are major arterials of regional significance and provide access to major destinations (L202 freeway, Phoenix-Mesa Gateway Airport, Arizona State University Ease, and Maricopa Community College).
Possible train derailment costs	No derailments have been reported per http://safetydata.fra.dot.gov/OfficeofSafety/default.aspx , and therefore associated cost savings are cannot be determined.

13. If this crossing was grade separated, provide a cost estimate of the project.

The total estimated construction, design, construction administration, and right-of-way cost is estimated to be \$30,243,537. The details of this estimate are attached to this memo.

14. Please describe what the surrounding areas are zoned for near this intersection. I.e. Are there going to be new housing developments, industrial parks etc.

The surrounding area includes a mixture of multi-family/low density residential (MF/L), multi-family/medium density residential (MF/M), single family-6 residential (SF-6), single family-7 residential (SF-7), single family detached residential (SF-D), Gateway Village Center (GVC), Gateway Business

Center (GBC) and public facility/institutions (PF/I), from the Town of Gilbert Planning & Development web page, http://www.ci.gilbert.az.us/planning/pdf/zoningmap_11-08.pdf. The area north of the crossing is currently being developed and plans have been submitted for "Cooley Station, Village Center and Business Park".

15. Please supply the following: number of daily train movements through the crossing, speed of the trains, and the type of movements being made (i.e. thru freight or switching). Is this a passenger train route?

From a 3/31/08 e-mail from Jim Smith/UPRR: The track is used for through freight service and there are an average of 6 trains per day. Maximum train speeds are 60 mph. The Union Pacific does not have any plans to construct a second track at this crossing at this time but will need to maintain the ability to add a second track if future expansion is needed. This is not a passenger train route. This information was also confirmed with Aziz Aman/UPRR on 5/28/2009.

16. Please provide the names and locations of all schools (elementary, junior high and high school) within the area of the crossing.

The crossing is within two school districts, Higley Unified School District No. 60 and Gilbert Unified School District No. 41. Schools located within these districts and a three mile radius of the crossing are listed as follows:

Elementary: Higley Elementary - 3391 E. Vest Avenue

Chaparral Elementary – 3380 E. Frye Road Cortina Elementary – 19680 S. 188th Street Eagles Aerie School – 17019 S. Greenfield Road

Gateway Pointe Elementary – 2069 S. De La Torre Drive Centennial Elementary – 3507 S. Ranch House Parkway

Coronado Elementary - 4333 S. Deanza Blvd

Power Ranch Elementary – 4351 S. Ranch House Parkway

SanTan Elementary – 3443 E. Calistoga Drive

Surrey Garden Christian School (k-12) - 1424 S. Promenade Lane

High School: Higley High School - 4068 E. Pecos Road

Perry High School – 1919 E. Queen Creek Road Williams Field High School – 2076 S. Higley Road

Surrey Garden Christian School (k-12) - 1424 S. Promenade Lane

17. Please provide school bus route information concerning the crossing, including the number of times a day a school bus crosses this crossing.

Per a phone conversation with Mike McGuire, the Transportation Routing Coordinator for the Higley School District, there are 39 daily trips through this crossing.

18. Please provide information about any hospitals in the area and whether the crossing is used extensively by emergency service vehicles.

The main Hospitals and health facilities are as follows:

Hospitals: Gilbert Hospital - 5656 S Power Road

Mercy Gilbert Medical Center - 3555 S. Val Vista Dr.

Health Facilities: Urgent Care Express - 920 E. Williams Field

East Valley Urgent Care - 641 W. Warner Road

No data is available for the number of emergency vehicles crossing at this location.

19. Please provide total cost of improvements to each crossing.

This project's street improvement cost at the RR crossing is estimated at \$139,000. The UPRR's estimated cost to the crossing is as follows:

•	Railroad track & surface: Railroad signal:	\$296,367 \$553,899		
•	UPRR Sub-Total: Roadway Improvements:	\$850,266 \$139,000		
•	Total:	\$989,266		

These costs are based on the agreement dated 4/16/2009.

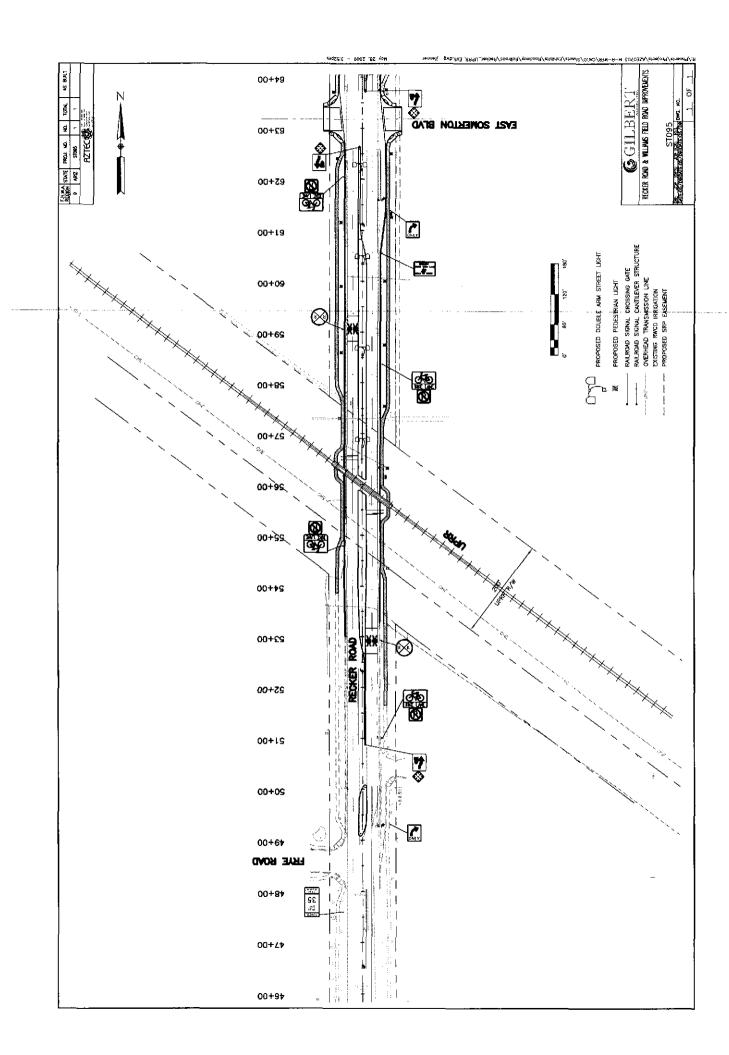
20. Provide any information as to whether vehicles carrying hazardous materials utilize this crossing and the number of times a day they might cross it.

No data is available for the number of vehicles carrying hazardous materials at this location.

- 21. Please Provide the posted vehicular speed limit for the roadway. 45 mph
- 22. Do any buses (other than school buses) utilize the crossing, and how many times a day do they cross the crossing.

There are no public bus routes through this crossing at this time.

c: Rick Allred/Town of Gilbert Project File: AZE0703 Attachment 1
8 ½" x 11" Conceptual Drawing



Attachment 2 Construction Cost Estimate of Grade Separate Crossing

Construction Cost Estimate of Grade Separated Crossing Recker Road/UPRR Crossing

Recker Rd-Over-pass @ UPRR crossing

Item	Quantity	Unit	Unit Cost	Cost
Excavation	3,780.00	CY	\$5.00	\$18,900.00
Fill	165,280.00	CY	\$5.00	\$826,400.00
Bridge	13,500.00	SF	\$200.00	\$2,700,000.00
Retaining Wall	27,100.00	ŞF	\$60.00	\$1,626,000.00
Right-of-Way	64,000.00	ŞF	\$7.00	\$448,000.00
Subgrade Preparation	21,933.00	SY	\$3.00	\$65,799.00
Temporary Construction Easement	176,000.00	SF	\$5.00	\$880,000.00
ABC 18"	15,300.00	SY	\$20.00	\$306,000.00
AC 1-1/2"	15,300.00	SY	\$9.00	\$137,700.00
AC 2-1/2 ⁴	15,300.00	SY	\$11.00	\$168,300.00
Tack Coat	30.00	TON	\$800.00	\$24,000.00
Vertical Curb & Gutter	3,780.00	LF	\$18.00	\$68,040.00
Vertical Curb	2,200.00	LF	\$15.00	\$33,000.00
Concrete Sidewalk	18,600.00	SF	\$5.00	\$93,000.00
Driveway Entrance	4.00	EA	\$10,000.00	\$40,000.00
Median Nose	2.00	EA	\$1,000.00	\$2,000.00
Median Brick Pavers	15,400.00	ŞF	\$20.00	\$308,000.00
Landscaping	1.00	L\$	\$500,000.00	\$500,000.00
Relocate Sewer Mains	700.00	LF	\$120.00	\$84,000.00
Relocate Water Mains	5,000.00	LF	\$100.00	\$500,000.00
Other Utility Relocations	1.00	LS	\$2,000,000.00	\$2,000,000.00
Drainage	1.00	LS	\$200,000.00	\$200,000.00
Signing	1.00	LS	\$20,000.00	\$20,000.00
Striping	1.00	LS	\$15,000.00	\$15,000.00
Traffic Control	1.00	LS	\$300,000.00	\$300,000.00
Impact to adjacent Property Owners	1.00	LS	\$1,000,000.00	\$1,000,000.00
Electrical/Lighting	1.00	LS	\$500,000.00	\$500,000.00
230 KV Relocation	1.00	LS	\$5,000,000.00	\$5,000,000.00
12 KV & 64 KV Relocation	1.00	Ł5	\$3,000,000.00	\$3,000,000.00
RWCD Relocation	1.00	L\$	\$500,000.00	\$500,000.00
			SUB TOTAL - RECKER	\$21,364,139.00

Frye Road

Item	Quantity	Unit	Unit Cost	Cost
Excavation	1,000.00	CY	\$5.00	\$5,000.00
Fill	9,000.00	CY	\$5.00	\$45,000.00
Retaining Walls	6,000.00	SF	\$60.00	\$360,000.00
Temporary Construction Easement	60,000.00	SF	\$5.00	\$300,000.00
Vertical Curb & Gutter	1,200.00	LF	\$18.00	\$21,600.00
6' Concrete Sidewalk	7,200.00	SF	\$5.00	\$36,000.00
Subgrade Preparation	4,067.00	SY	\$3.00	\$12,201.00
ABC 18"	6,267.00	ŞY	\$20.00	\$125,340.00
AC 1-1/2"	6,267.00	ŞY	\$9.00	\$56,403.00
AC 2-1/2"	6,267.00	SY	\$11.00	\$68,937.00
Tack Coat	10.00	TON	\$800.00	\$8,000.00
			SUB TOTAL - FRYE	\$1,038,481.00
			SUB TOTAL	\$22,402,620.00

General Items

ltem	Quantity	Unit	Unit Cost	Cost
Mobilization (10%)	1.00	LS	\$2,240,262.00	\$2,240,262.00
Administration (15%)	1.00	LS	\$3,360,393.00	\$3,360,393.00
Design (10%)	1.00	LS	\$2,240,262.00	\$2,240,262.00
		SL	JB TOTAL - GENERAL	\$7,840,917.00
			TOTAL	\$30,243,537.00

Attachment 3

Executed Agreement between Town of Gilbert and UPRR dated 4-16-09



April 16, 2009

UPRR Folder No. 2538-74

MR RICK ALLRED TOWN OF GILBERT 90 E CIVIC CENTER DR GILBERT AZ 85296

Dear Mr. Allred:

Attached is your original copy of a <u>Supplemental Agreement</u>, fully executed on behalf of the Railroad Company.

In order to protect the Railroad Company's property as well as for safety reasons, it is imperative that you notify the Railroad Company's Manager of Track Maintenance and the Communications Department:

Aziz Aman Manager Public Projects Union Pacific Railroad Company 2073 East Jade Drive Chandler, AZ 85286 Phone: 480-415-2364 aaman@up.com

Fiber Optics Hot Line 1-800-336-9193

If you have any questions, please contact me.

incerely Yours.

MUL G. FARRELL

Senier Manager Contracts phone: (402) 544-8620

e-mail: pgfarrell@up.com



UPRR Folder No.: 2538-74 UPRR Audit No. **250454**

SUPPLEMENTAL AGREEMENT (EXISTING PUBLIC ROAD CROSSING IMPROVEMENT)

THIS SUPPLEMENTAL AGREEMENT is made as of the _______ day of

RECITALS:

By instrument dated May 29, 1928, the Phoenix & Eastern Railroad Company and the County of Maricopa entered into an agreement (the "Original Agreement"), identified in the records of the Railroad as Folder No. 2538-74, Audit No. 250454, covering the construction, use, maintenance and repair of an at grade public road crossing, known as Recker Road, DOT No. 741-832M, at Railroad's Mile Post 933.15 on it's Phoenix Subdivision, in Maricopa County, near the Town of Gilbert, Arizona.

The Railroad named herein is successor in interest to the Phoenix & Eastern Railroad Company, and the Town herein is successor in interest to the County of Maricopa.

The Town now desires to undertake as its project (the "Project"):

 the reconstruction and widening of the road crossing that was constructed under the Original Agreement. The structure, as reconstructed and widened is hereinafter the "Roadway" and where the Roadway crosses the Railroad's property is the "Crossing Area."

The right of way granted by Phoenix & Eastern Railroad Company to the County under the terms of the Original Agreement is not sufficient to allow for the reconstruction and widening of the road crossing constructed under the Original Agreement. Therefore, under this Agreement, the Railroad will be granting an additional right of way right to the Town to facilitate the reconstruction and widening of the road crossing. The portion of Railroad's property that Town needs a right to use in connection with the road crossing (including the right of way area covered under the Original Agreement) is shown on the Railroad Location Print marked Exhibit A, the Detailed Print marked Exhibit A-1, described in the Legal Description marked Exhibit A-2, and illustrated on the Illustrative Print of the Legal Description marked Exhibit A-3, with each exhibit being attached hereto and hereby made a part hereof (the "Crossing Area").

The Railroad and the Town are entering into this Agreement to cover the above.

AGREEMENT:

NOW THEREFORE, in consideration of the premises and of the promises and conditions hereinafter set forth, the parties hereto agree as follows:



SECTION 1.

The exhibits below are attached hereto and hereby made a part hereof.

Exhibit Λ	Railroad Location Print
Exhibit A-1	Detailed/Specification Print
Exhibit A-2	Legal Description
Exhibit A-3	Illustrative Print of Legal Description
Exhibit B	Railroad's Track & Surface Material Estimate
Exhibit B-1	Railroad's Signal Material Estimate
Exhibit C	Railroad Form of Contractor's Right of Entry Agreement

SECTION 2.

The Railroad, at Town's expense, shall furnish all labor, material, equipment and supervision for the Roadway improvements:

- Re-lay 320-feet of track;
- Install 144-feet of concrete road crossing panels;
- Install 100 cross ties;
- Install 2 carloads of ballast and other track and surface materials;
- Install automatic flashing light crossing signals with gates and other signal matrials;
- Engineering, and
- Flagging.

SECTION 3.

- A. The work to be performed by the Railroad, at the Town's sole cost and expense, is described as follows:
 - Railroad's Track & Surface Material Estimate dated January 5, 2009, in the amount of \$296,367.00, marked Exhibit B, and
 - Railroad's Signal Material Estimate dated January 6, 2009, in the amount of \$553,899.00, marked Exhibit B-1,

each attached hereto and hereby made a part hereof (collectively the "Estimate"). As set forth in the Estimate, the Railroad's combined estimated cost for the Railroad's work associated with the Project is (\$850,266.00).

(each) attached hereto and hereby made a part hereof (collectively the "Estimate").

- B. The Railroad, if it so elects, may recalculate and update the Estimate submitted to the Town in the event the Town does not commence construction on the portion of the Project located on the Railroad's property within six (6) months from the date of the Estimate.
- C. The Town acknowledges that the Estimate does not include any estimate of flagging or other protective service costs that are to be paid by the Town or the Contractor in connection with flagging or other protective services provided by the Railroad in connection with the Project. All of such costs incurred by the Railroad are to be paid by the Town or the Contractor as determined by the Railroad and the Town. If it is determined that the Railroad will be billing the Contractor directly for such costs, the Town agrees that it will pay the Railroad for any



- flagging costs that have not been paid by any Contractor within thirty (30) days of the Contractor's receipt of billing.
- D. The Town agrees to reimburse the Railroad for one hundred percent (100%) of all actual costs incurred by the Railroad in connection with the Project including, but not limited to, actual costs of preliminary engineering review, construction inspection, procurement of materials, equipment rental, manpower and deliveries to the job site and all of the Railroad's normal and customary additives (which shall include direct and indirect overhead costs) associated therewith.

SECTION 4.

- A. The Town, at its expense, shall prepare, or cause to be prepared by others, the detailed plans and specifications and submit such plans and specifications to the Railroad's Assistant Vice President Engineering Design, or his authorized representative, for review and approval. The plans and specifications shall include all Roadway layout specifications, cross sections and elevations, associated drainage, and other appurtenances.
- B. The final one hundred percent (100%) completed plans that are approved in writing by the Railroad's Assistant Vice President Engineering–Design, or his authorized representative, are hereinafter referred to as the "Plans". The Plans are hereby made a part of this Agreement by reference.
- C. No changes in the Plans shall be made unless the Railroad has consented to such changes in writing.
- D. Notwithstanding the Railroad's approval of the Plans, the Railroad shall not be responsible for the permitting, design, details or construction of the Roadway.

SECTION 5.

The Railroad, at the Town's expense, shall maintain the crossing between the track tie ends. If, in the future, the Town elects to have the surfacing material between the track tie ends replaced with paving or some surfacing material other than timber planking, the Railroad, at Town's expense, shall install such replacement surfacing.

SECTION 6.

- A. The Town, at its sole cost and expense, shall provide traffic control, barricades, and all detour signing for the crossing work, provide all labor, material and equipment to install concrete or asphalt street approaches, and if required, will install advanced warning signs, and pavement markings in compliance and conformance with the Manual on Uniform Traffic Control Devices.
- B. The Town, at its expense, shall maintain and repair all portions of the Roadway approaches that are not within the track tie ends.

SECTION 7.

If Town's contractor(s) is/are performing any work described in Section 6 above, then the Town shall require its contractor(s) to execute the Railroad's standard and current form of



Contractor's Right of Entry Agreement attached hereto as **Exhibit C**. Town acknowledges receipt of a copy of the Contractor's Right of Entry Agreement and understanding of its terms, provisions, and requirements, and will inform its contractor(s) of the need to execute the Agreement. Under no circumstances will the Town's contractor(s) be allowed onto the Railroad's premises without first executing the Contractor's Right of Entry Agreement.

SECTION 8.

Fiber optic cable systems may be buried on the Railroad's property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. Town or its contractor(s) shall telephone the Railroad during normal business hours (7:00 a.m. to 9:00 p.m., Central Time, Monday through Friday, except holidays) at 1-800-336-9193 (also a 24-hour number, 7 day number for emergency calls) to determine if fiber optic cable is buried anywhere on the Railroad's premises to be used by the Town or its contractor(s). If it is, Town or its contractor(s) will telephone the telecommunications company(ies) involved, arrange for a cable locator, and make arrangements for relocation or other protection of the fiber optic cable prior to beginning any work on the Railroad's premises.

SECTION 9.

The Town, for itself and for its successors and assigns, hereby waives any right of assessment against the Railroad, as an adjacent property owner, for any and all improvements made under this agreement.

SECTION 10.

Covenants herein shall inure to or bind each party's successors and assigns; provided, no right of the Town shall be transferred or assigned, either voluntarily or involuntarily, except by express prior written consent of the Railroad.

SECTION 11.

The Town shall, when returning this agreement to the Railroad (signed), cause same to be accompanied by such Order, Resolution, or Ordinance of the governing body of the Town, passed and approved as by law prescribed, and duly certified, evidencing the authority of the person executing this agreement on behalf of the Town with the power so to do, and which also will certify that funds have been appropriated and are available for the payment of any sums herein agreed to be paid by Town.

SECTION 12.

The Town agrees to reimburse the Railroad the cost of future maintenance of the automatic grade-crossing protection within thirty (30) days of the Town's receipt of billing.

SECTION 13.

For and in consideration THREE THOUSAND NINE HUNDRED THIRTY-NINE **DOLLARS** (\$3,939.00) to be paid by the Town to the Railroad upon the execution and delivery of



this Agreement and in further consideration of the Town's agreement to perform and abide by the terms of this Agreement including all exhibits, the Railroad hereby grants to the Town the right to establish or reestablish, construct or reconstruct, maintain, repair and renew the road crossing over and across the Crossing Area.

SECTION 14.

This agreement is supplemental to the Original Agreement, as herein amended, and nothing herein contained shall be construed as amending or modifying the same except as herein specifically provided.

IN WITNESS WHEREOF, the parties hereto have caused this Supplemental Agreement to be executed as of the day and year first hereinabove written.

UNION PACIFIC RAILROAD COMPANY

(Federal **Xax**'ID #94-6001323)

JAMES P. GADE

Director Contracts

WITNESS:

theire a Temples

Title: Seven M. Bernan Milyo

TOWN OF GILBERT

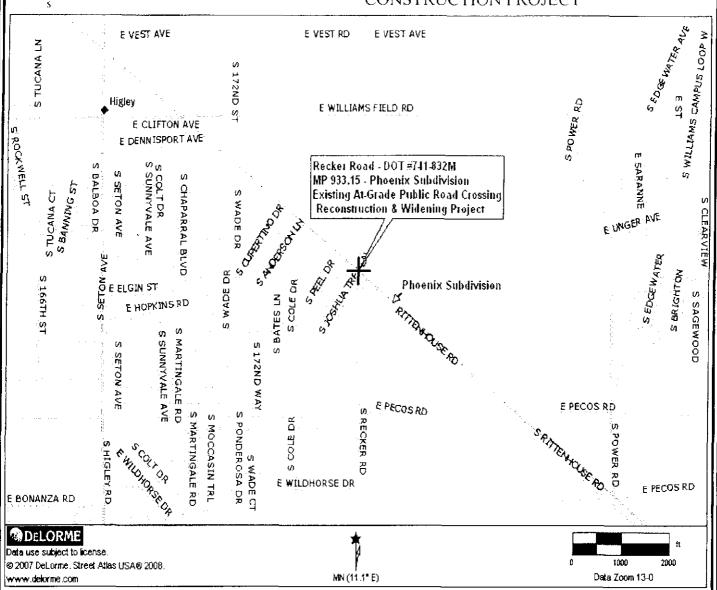
EXHIBIT A

To Supplemental Agreement (Existing Public Road Crossing Improvement)

Cover Sheet for the Railroad Location Print



RAILROAD LOCATION PRINT OF A PUBLIC ROAD CROSSING CONSTRUCTION PROJECT



RAILROAD WORK TO BE PERFORMED:

- Re-lay 320-feet of track; Install 144-feet of concrete road crossing panels; Install 100 cross ties; Install 2 carloads of ballast; and other track & surface materials.
- 2. Install automatic flashing light crossing signals with gates; Relocate existing gates, signals, conduits and other signal facilities; and other signal materials.
- 3. Engineering Design Review & Flagging.

BRIEF DESCRIPTION:

A parcel of land located in the East ½ of Section 35 and the SW¼ of Section 36, Township 1 South, Range 6 East of the Gila & Salt River Meridian, in Maricopa County, Arizona.

EXHIBIT "A"

UNION PACIFIC RAILROAD COMPANY

PHOENIX SUBDIVISION MILE POST 933.15 GPS: N 33° 17.9740', W 111° 42.2248' GILBERT, MARICOPA CO., AZ.

Location print of an existing at-grade public road crossing reconstruction, widening and improvement project with the **TOWN OF GILBERT**.

Folder No. 2538-74

Date: January 26, 2009

WARNING

IN ALL OCCASIONS, UP GOMMUNICATIONS DEPARTMENT MUST RIC CONTACTED IN ADVANCE OF ANY WORK TO DETERMINE EXISTENCE, AND EGOATION OF TIBLE OPTIC CABLE PHONE, 1-(800) 336-9195

EXHIBIT A-1

To Supplemental Agreement (Existing Public Road Crossing Improvement)

Cover Sheet for the Detailed Print

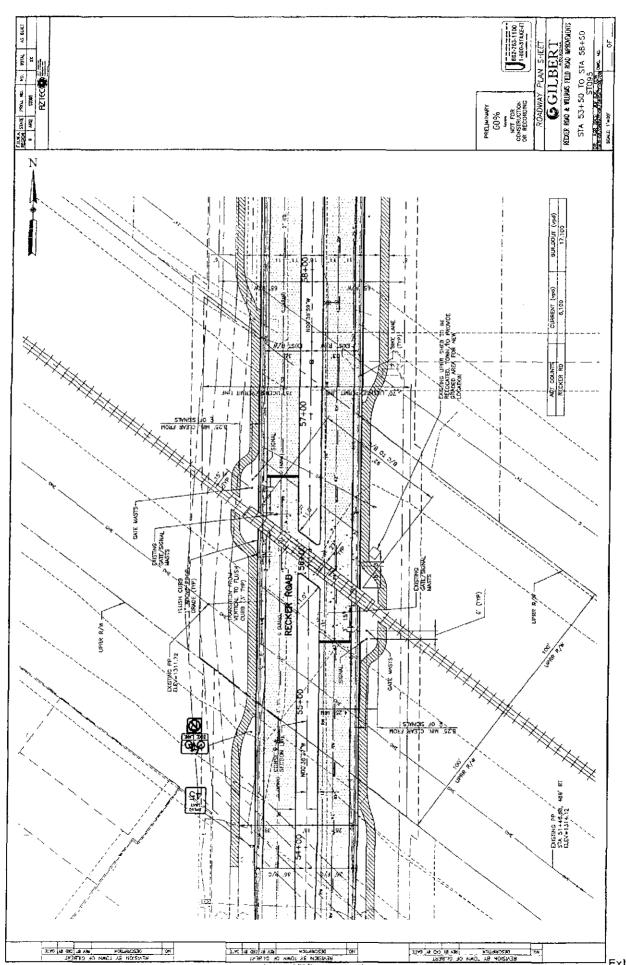


EXHIBIT A-2

To Supplemental Agreement (Existing Public Road Crossing Improvement)

Cover Sheet for the Legal Description

EXHIBIT A Legal Description Right-of-Way

A parcel of land located in the East Half of Section 35 and the Southwest Quarter of Section 36, Township 1 South, Range 6 East of the Gila and Salt River Meridian, Maricopa County, Arizona, more particularly described as follows:

Commencing at the Southeast Corner of said Section 35, a Brass cap in a handhole, whence the East Quarter Corner of said Section 35, an Aluminum cap 0.2' down, bears N 00° 38' 27" W, a distance of 2636.04 feet;

THENCE along the East line of said Section 35, N 00° 38' 27" W, a distance of 2373.48 feet to the Southerly line of the Union Pacific Railroad Company Right-of-Way (UPROW), according to an Unrecorded map filed in Right-of-Way Serial No. AZPHX-0086615 and to the TRUE POINT OF BEGINNING;

THENCE leaving said East line, along said Southerly line, N 53° 37' 46" W, a distance of 93.92 feet to the West line of the East 75.00 feet of said Section 35;

THENCE leaving said Southerly line, along said West line, N 00° 38' 27" W, a distance of 250.47 feet to the Northerly line of said UPROW;

THENCE leaving said West line, along said Northerly line, S 53° 37' 46" E, a distance of 181.59 feet to the East line of the West 70.00 feet of said Section 36;

THENCE leaving said Northerly line, along said East line, S 00° 38′ 27″ E, a distance of 250.47 feet to said Southerly line;

November 5, 2007 Page 2 of 2

THENCE leaving said East line, along said Southerly line, N 53° 37' 46" W, a distance of 87.66 feet to the TRUE POINT OF BEGINNING.

Containing 36,317 square feet (0.83 Ac.) ±.

This Description is located within an area surveyed by AZTEC in May-July 2007. And is also based on Maricopa County GDACS. Monumentation as noted in this Description is within acceptable standards (as defined in "Arizona Boundary Survey Minimum Standards") based on said survey.



EXHIBIT A-3

To Supplemental Agreement (Existing Public Road Crossing Improvement)

Cover Sheet for the Illustrative Print of Legal Description

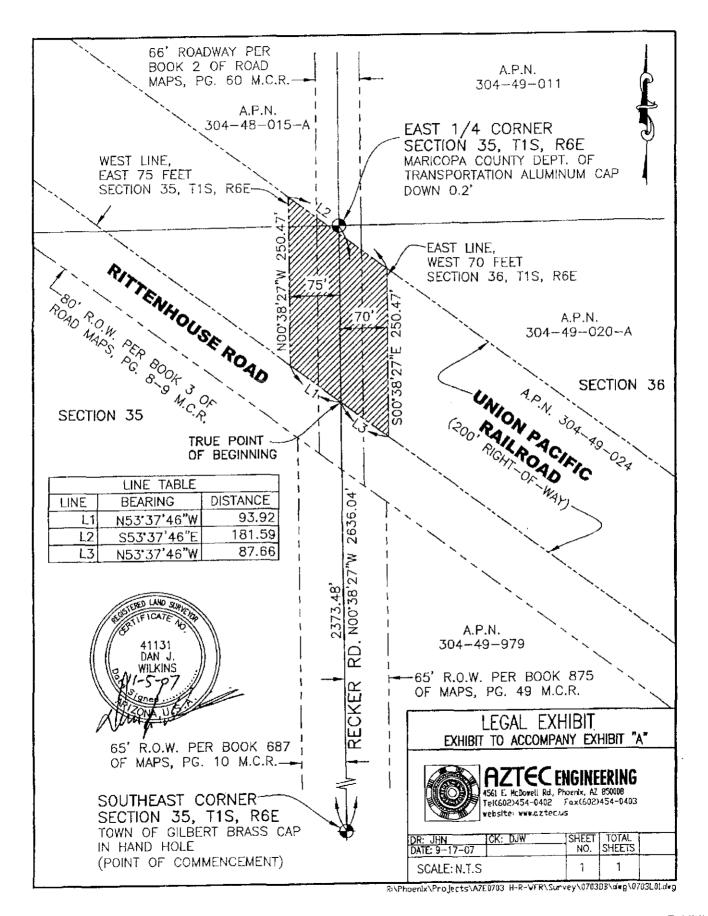


EXHIBIT B

To Supplemental Agreement (Existing Public Road Crossing Improvement)

Cover Sheet for the Railroad's Track & Surface Material Estimate

DATE: 2009-01-05

MP, SUBDIV: 933.15, PHOENIX

ESTIMATE OF MATERIAL AND FORCE ACCOUNT WORK BA LHR UNION PACIFIC RATEROAD

THIS ESTIMATE GOOD FOR 6 MONTHS EXPIRATION DATE IS :2009-07-06

DESCRIPTION OF WORK:

RECOLLECT ROAD CROSSING - PHOENIX SUB - MP 933.15 - RECKER RD. 100% RECOLLECT FROM TOWN OF GILBERT , AZ. USING FEDERAL ADDITIVES WITH INDIRECT AND OVERHEAD CONSTRUCTION COST, 205%. 1 XING LOCATION - 144 TP OF CONCRETE XING

2 CARS OF BALLAST.

PID: 60169 AWO: 35361

P1D: 00103				FIE , SOI		33.13, ENDI	21.1 X V.
SERVICE UNIT: 16	GITY:	erre	ERT	S'I	PATE: AZ		
DESCRIPTION	OTY	UNIT	LABOR	MATERIAL	RECOLL	UPRR	TOTAL
****							·
ENGINEERING WORK							
ENGINEERING			10000		10000		10000
LABOR ADDITIVE 205%			20500		20500		20500
TOTAL ENGINEERING			3050 0		30500		30500
SIGNAL WORK							
LABOR ADDITIVE 205%			2084		2084		2084
SALES TAX			3.03.0	2			2
SIGNAL			1017				1086
TOTAL SIGNAL			3101	71			3172
TOTAL SIGNAL			3,01	1.1	3112		3272
TRACK & SURFACE WORK							
BALAST	2.00	CL	2280	1521	3801		3801
BYLL PREP				900	900		900
ENVIRONMENTAL PERMITS				ı			1
RIETD METO			350		350		350
HOMELINE FREIGHT				900	900		900
LABOR ADDITIVE 205%			86458		86458		86458
MATL STORE EXPENSE				474	474		474
OTH			2702	3071	5773		5773
RAIL	320.00	LF	3655	6915	10570		10570
RDXING	144.00	TF	17310	29416	46726		45726
SALES TAX				1992	1992		1992
SAW CUT STREET APPROACH				6000	6000		6000
TRAFFIC CONTROL				20000	20000		50000
TRK-SURF, LIN			8561		8561		8561
Weld			11320		11574		11574
XIIE	100.00	EΛ	22898				31615
10% CONTINGENCY				27000			27000
	_					•	
TOTAL TRACK & SURFACE	\$		155534	107161	202035		262695
LARCE/MATERIAL EXPENS	÷ ₩			107232			
RECOLLECTIBLE/UPRR EX				101255	296367		
ESTIMATED PROJECT COS						_	296367
EXISTING REUSEABLE MA		CREDI	ΙΤ		G-		
SALVAGE NONUSEABLE M					0		

RECOLLECTIBLE LESS CREDITS

THE ABOVE FIGURES ARE ESTIMATES ONLY AND SUBJECT TO PLUCTUATION. IN THE EVENT OF AN INCREASE OR DECREASE IN THE COST OR QUARTITY OF MATERIAL OR LABOR REQUIRED,

EXHIBIT B-1

To Supplemental Agreement (Existing Public Road Crossing Improvement)

Cover Sheet for the Railroad's Signal Material Estimate

DATE: 2009-01-06

MP, SUBDIV: 933.15, PHOENIX

ESTIMATE OF MATERIAL AND FORCE ACCOUNT WORK $\mathtt{BY} \quad \mathtt{THE}$

UNION PACIFIC RAILROAD

THIS ESTIMATE GOOD FOR 6 MONTHS EXPIRATION DATE IS :2009-07-07

DESCRIPTION OF WORK:

INSTALL AUTOMATIC FLASHING LIGHT CROSSING SIGNALS
WITH GATES AT GILBERT, AZ. RECKER ROAD M.P.933.15
ON THE PHOEMIX SUB DOT#741 832M

WORK TO BE PERFORMED BY RAILROAD WITH EXPENSE AS BELOW:
SIGNAL & TRACK - TOWN OF GILBERT - 100%
ESTIMATED USING PEDERAL ADDITIVES WITH OVERHEAD & INDIRECT
CONSTRUCTION COST - SIGNAL 167.76% & TRACK 204.59%

PID: 60168 AWO: 85360

SERVICE UNIT: 16	CITY:	Y: GILBERT		STATE: AZ				
				_				
DESCRIPTION	QTY	UNIT	LABOR	MATERIAL	REÇOLL	UPRR	TOTAL	
ENGINEERING WORK								
BILL PREP			900		900		900	
CONTRACT				9165	9165		9165	
ENGINEERING			6210		6210		6210	
ENVIRONMENTAL				1	1		1	
INSTALL METER				1200	1200		1200	
LABOR ADDITIVE 167.76%			214027		214027		214027	
PERMITTING				67818	67848		67848	
PREDIMINARY ENGINEERING				20000	20000		20000	
ROCK/GRAVEL/FILL				1800	1800		1800	
SIG-HWY XNG			119829		119829		119829	
TRANSP/18/08/RCLW CONTR				13833	13833		33833	
		-	-					
TOTAL ENGINEERING			340966	113847	454813		454813	
SIGNAL WORK								
LABOR ADDITIVE 167.76%			1706		1706		1706	
MATE STORE EXPENSE			2746	4			4	
SALES TAX				3552			3552	
STGNAL			1017				89829	
atomed								
TOTAL SIGNAL				92368			95091	
TRACK & SURFACE NORK								
FIELD WELD			48		48		48	
MATL STORE EXPENSE				84	84		84	
отм			905	2590	3496		3496	
SALES TAX				113	113		113	
WELD				254	254		254	
TOTAL TRACK & SURFACE			984	3041	3995		3995	
								
LABOR/WATERIAL EXPENSE		1	344643	209256				
recollectials/UFRR exp	ENSE				553899	0		
ESTIMATED PROJECT COST							553899	

THE ABOVE FIGURES ARE ESTIMATES ONLY AND SUBJECT TO FIGURATION. IN THE EVENT OF

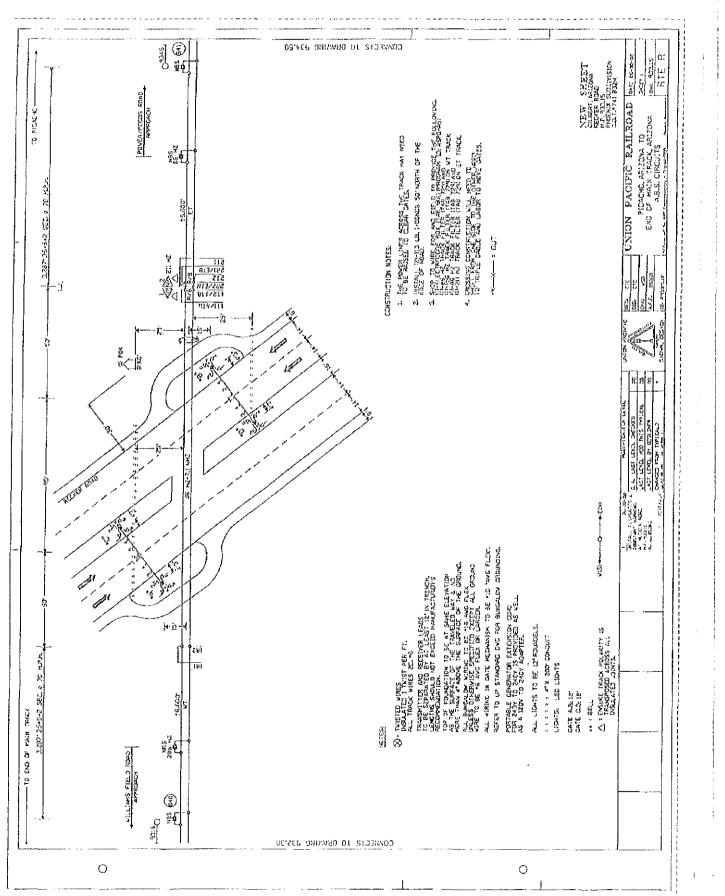


EXHIBIT C

To Supplemental Agreement (Existing Public Road Crossing Improvement)

Cover Sheet for the Form of Contractor's Right of Entry Agreement



January 26, 2009

UPRR Folder No.: 2538-74

To the Contractor:

Before Union Pacific Railroad Company can permit you to perform work on its property for the reconstruction and widening of the existing Recker Road at-grade public road crossing, it will be necessary for you to complete and execute two originals of the enclosed *Contractor's Right of Entry Agreement*. Please:

- 1. Fill in the <u>complete</u> legal name of the contractor in the space provided on Page 1 of the Contractor's Right of Entry Agreement. If a corporation, give the state of incorporation. If a partnership, give the names of all partners.
- 2. Fill in the date construction will begin and be completed in Article 5, Paragraph A.
- 3. Fill in the name of the contractor in the space provided in the signature block at the end of the Contractor's Right of Entry Agreement. If the contractor is a corporation, the person signing on its behalf must be an elected corporate officer.
- 4. Execute and return all copies of the Contractor's Right of Entry Agreement together with your Certificate of Insurance as required in Exhibit B, in the attached, self-addressed envelope.
- 5. Include a check made payable to the Union Pacific Railroad Company in the amount of \$500.00. If you require formal billing, you may consider this letter as a formal bill. In compliance with the Internal Revenue Services' new policy regarding their Form 1099, I certify that 94-6001323 is the Railroad Company's correct Federal Taxpayer Identification Number and that Union Pacific Railroad Company is doing business as a corporation.

Under Exhibit B of the enclosed Contractor's Right of Entry Agreement, you are required to procure Railroad Protective Liability Insurance (RPLI) for the duration of this project. As a service to you, Union Pacific is making this coverage available to you. If you decide that acquiring this coverage from the Railroad is of benefit to you, please contact Mr. Mike McGrade of Marsh USA @ 800-729-7001, e-mail: william.j.smith@marsh.com.

This agreement will not be accepted by the Railroad Company until you have returned <u>all</u> of the following to the undersigned at Union Pacific Railroad Company:

- 1. Executed, unaltered duplicate original counterparts of the Contractor's Right of Entry Agreement;
- 2. Your check in the amount of \$500.00 to pay the required balance due of the required Contractor's Right of Entry fee. (The Folder Number and the name "Paul G. Farrell" should be written on the check to insure proper credit). If you require formal billing, you may consider this letter as a formal bill:
- 3. Copies of all of your <u>up-to-date</u> General Liability, Auto Liability & Workman's Compensation Insurance Certificates *(yours and all contractors')*, naming Union Pacific Railroad Company as additional insured:



4. Copy of your <u>up-to-date</u> Railroad Protective Liability Insurance Certificate (yours and all contractors'), naming Union Pacific Railroad Company as additional insured.

RETURN ALL OF THESE REQUIRED ITEMS TOGETHER IN ONE ENVELOPE. DO NOT MAIL ANY ITEM SEPARATELY.

If you have any questions concerning this agreement, please contact me as noted below. Have a safe day!

Paul G. Farrell

Senior Manager Contracts Phone: (402) 544-8620 e-mail: pgfarrell@up.com





UPRR Folder No.: 2538-74
UPRR Audit No.:
CONTRACTOR'S RIGHT OF ENTRY AGREEMENT
THIS AGREEMENT is made and entered into as of the, day of, by and between UNION PACIFIC RAILROAD COMPANY, a Delaware corporation "Railroad"); and
(NAME OF CONTRACTOR) corporation ("Contractor").
(State of Corporation)
RECITALS:
Contractor has been hired by the <i>Town of Gilbert</i> to perform work relating to the reconstruction and widening of the existing Recker Road at-grade public road crossing (the "work"), with all or a portion of such work to be performed on property of Railroad in the vicinity of the Railroad's Mile Post 933.15 on the Railroad's Phoenix Subdivision in Gilbert, Maricopa County, Arizona, as such ocation is in the general location shown on the Railroad Location Print marked Exhibit A , and as pecified on the Detailed Print marked Exhibit A-1 , each attached hereto and hereby made a part
hereof, which work is the subject of a contract dated
The Railroad is willing to permit the Contractor to perform the work described above at the ocation described above subject to the terms and conditions contained in this Agreement
AGREEMENT:
NOW, THEREFORE, it is mutually agreed by and between Railroad and Contractor, as oflows:
ARTICLE 1 - <u>DEFINITION OF CONTRACTOR</u> .
For purposes of this Agreement, all references in this agreement to Contractor shall include Contractor's contractors, subcontractors, officers, agents and employees, and others acting under its or their authority.

ARTICLE 2 - RIGHT GRANTED; PURPOSE.

Railroad hereby grants to Contractor the right, during the term hereinafter stated and upon and subject to each and all of the terms, provisions and conditions herein contained, to enter upon and have ingress to and egress from the property described in the Recitals for the purpose of performing the work described in the Recitals above. The right herein granted to Contractor is limited to those



portions of Railroad's property specifically described herein, or as designated by the Railroad Representative named in Article 4.

ARTICLE 3 - TERMS AND CONDITIONS CONTAINED IN EXHIBITS B, C & D.

The terms and conditions contained in **Exhibit B**, **Exhibit C** and **Exhibit D**, attached hereto, are hereby made a part of this Agreement.

ARTICLE 4 - <u>ALL EXPENSES TO BE BORNE BY CONTRACTOR; RAILROAD</u> REPRESENTATIVE.

- A. Contractor shall bear any and all costs and expenses associated with any work performed by Contractor, or any costs or expenses incurred by Railroad relating to this Agreement.
- B. Contractor shall coordinate all of its work with the following Railroad representative or his or her duly authorized representative (the "Railroad Representative"):

Mike Battista
Manager Track Maintenance
Union Pacific Railroad Company
1255 South Campbell Avenue
Tucson, AZ 85713
Phone: 602-322-2506
Fax: 602-322-2515

John Clark
Manager Signal Maintenance
Union Pacific Railroad Company
301 Gila Street
Yuma, AZ 85364
Phone: 925-343-4563
Fax: 928-343-4558

C. Contractor, at its own expense, shall adequately police and supervise all work to be performed by Contractor and shall ensure that such work is performed in a safe manner as set forth in Section 7 of Exhibit B. The responsibility of Contractor for safe conduct and adequate policing and supervision of Contractor's work shall not be lessened or otherwise affected by Railroad's approval of plans and specifications involving the work, or by Railroad's collaboration in performance of any work, or by the presence at the work site of a Railroad Representative, or by compliance by Contractor with any requests or recommendations made by Railroad Representative.

ARTICLE 5 - TERM; TERMINATION.

A.	The grant of right herein made to Contractor	or shall commence on the date of this Agreement, and
	continue until	, unless sooner terminated as herein provided, or
	(Expiration Date)	
	at such time as Contractor has completed	its work on Railroad's property, whichever is earlier.
	Contractor agrees to notify the Railroad Re	epresentative in writing when it has completed its work
	on Railroad's property.	

B. This Agreement may be terminated by either party on ten (10) days written notice to the other party.

ARTICLE 6 - CERTIFICATE OF INSURANCE.

A. Before commencing any work, Contractor will provide Railroad with the (i) insurance binders, policies, certificates and endorsements set forth in Exhibit C of this Agreement, and (ii) the



insurance endorsements obtained by each subcontractor as required under Section 12 of **Exhibit B** of this Agreement.

B. All insurance correspondence, binders, policies, certificates and endorsements shall be sent to:

Union Pacific Railroad Company Real Estate Department 1400 Douglas Street, MS 1690 Omaha, NE 68179-1690 UPRR Folder No.: 2538-74

ARTICLE 7 - DISMISSAL OF CONTRACTOR'S EMPLOYEE.

At the request of Railroad, Contractor shall remove from Railroad's property any employee of Contractor who fails to conform to the instructions of the Railroad Representative in connection with the work on Railroad's property, and any right of Contractor shall be suspended until such removal has occurred. Contractor shall indemnify Railroad against any claims arising from the removal of any such employee from Railroad's property.

ARTICLE 8 - ADMINISTRATIVE FEE.

Upon the execution and delivery of this Agreement, Contractor shall pay to Railroad FIVE HUNDRED DOLLARS (\$500.00) as reimbursement for clerical, administrative and handling expenses in connection with the processing of this Agreement.

ARTICLE 9 - CROSSINGS.

No additional vehicular crossings (including temporary haul roads) or pedestrian crossings over Railroad's trackage shall be installed or used by Contractor without the prior written permission of Railroad.

ARTICLE 10 - EXPLOSIVES.

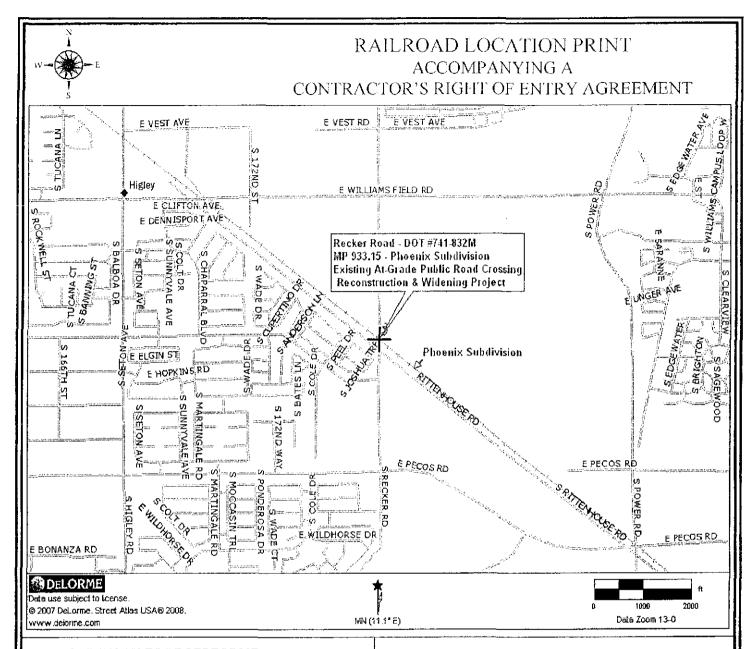
Explosives or other highly flammable substances shall not be stored on Railroad's property without the prior written approval of Railroad.



IN WITNESS WHEREOF, the parties hereto have duly executed this agreement in duplicate as of the date first herein written.

	PAUL G. FARRELL
	Senior Manager Contracts
	(Name of Contractor)
,	

UNION PACIFIC RAILROAD COMPANY (Federal Tax ID #94-6001323)



RAILROAD WORK TO BE PERFORMED:

- 1. Re-lay 320-feet of track; Install 144-feet of concrete road crossing panels; Install 100 cross ties; Install 2 carloads of ballast; and other track & surface materials.
- 2. Install automatic flashing light crossing signals with gates; Relocate existing gates, signals, conduits and other signal facilities; and other signal materials.
- 3. Engineering Design Review & Flagging.

BRIEF DESCRIPTION:

A parcel of land located in the East ½ of Section 35 and the SW¼ of Section 36, Township 1 South, Range 6 East of the Gila & Salt River Meridian, in Maricopa County, Arizona.

EXHIBIT "A"

UNION PACIFIC RAILROAD COMPANY

PHOENIX SUBDIVISION MILE POST 933.15 GPS: N 33° 17.9740', W 111° 42.2248' GILBERT, MARICOPA CO., AZ.

To accompany Contractor's Right of Entry Agreement with

(Name of Contractor)

for an existing at-grade public road crossing reconstruction, widening and improvement project.

Folder No. 2538-74

Date: January 26, 2009

WARNING

IN ALL OCCASIONS, U.P. COMMUNICATIONS DEPARTMENT MUST BE CONTACTED IN ADVANCE OF ANY WORK TO DETERMINE ENISTENCE AND LOCATION OF FIBER OPTIC CABLE PHONE, 1-(800) 336-9193

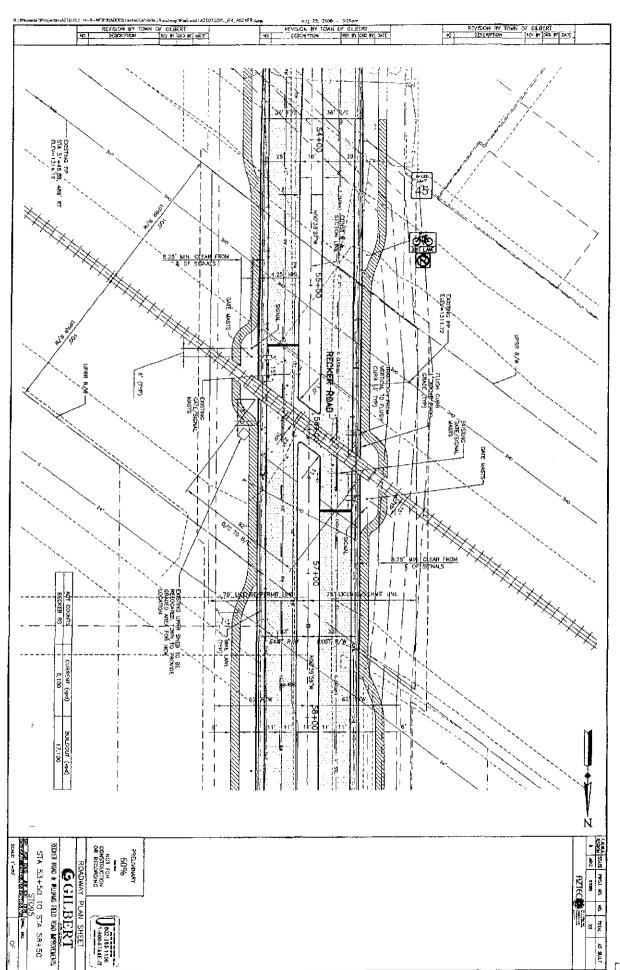


Exhibit A-1 Detailed Print



EXHIBIT B

TO CONTRACTOR'S RIGHT OF ENTRY AGREEMENT

TERMS AND CONDITIONS

Section 1. NOTICE OF COMMENCEMENT OF WORK - FLAGGING.

- A. Contractor agrees to notify the Railroad Representative at least ten (10) working days in advance of Contractor commencing its work and at least ten (10) working days in advance of proposed performance of any work by Contractor in which any person or equipment will be within twenty-five (25) feet of any track, or will be near enough to any track that any equipment extension (such as, but not limited to, a crane boom) will reach to within twenty-five (25) feet of any track. No work of any kind shall be performed, and no person, equipment, machinery, tool(s), material(s), vehicle(s), or thing(s) shall be located, operated, placed, or stored within twenty-five (25) feet of any of Railroad's track(s) at any time, for any reason, unless and until a Railroad flagman is provided to watch for trains. Upon receipt of such ten (10)-day notice, the Railroad Representative will determine and inform Contractor whether a flagman need be present and whether Contractor needs to implement any special protective or safety measures. If flagging or other special protective or safety measures are performed by Railroad, Railroad will bill Contractor for such expenses incurred by Railroad, unless Railroad and a federal, state or local governmental entity. If Railroad will be sending the bills to Contractor, Contractor shall pay such bills within thirty (30) days of Contractor's receipt of billing. If Railroad performs any flagging, or other special protective or safety measures are performed by Railroad, Contractor agrees that Contractor is not relieved of any of its responsibilities or liabilities set forth in this Agreement.
- B. The rate of pay per hour for each flagman will be the prevailing hourly rate in effect for an eight-hour day for the class of flagmen used during regularly assigned hours and overtime in accordance with Labor Agreements and Schedules in effect at the time the work is performed. In addition to the cost of such labor, a composite charge for vacation, holiday, health and welfare, supplemental sickness, Railroad Retirement and unemployment compensation, supplemental pension, Employees Liability and Property Damage and Administration will be included, computed on actual payroll. The composite charge will be the prevailing composite charge in effect at the time the work is performed. One and one-half times the current hourly rate is paid for overtime, Saturdays and Sundays, and two and one-half times current hourly rate for holidays. Wage rates are subject to change, at any time, by law or by agreement between Railroad and its employees, and may be retroactive as a result of negotiations or a ruling of an authorized governmental agency. Additional charges on labor are also subject to change. If the wage rate or additional charges are changed, Contractor (or the governmental entity, as applicable) shall pay on the basis of the new rates and charges.
- C. Reimbursement to Railroad will be required covering the full eight-hour day during which any flagman is furnished, unless the flagman can be assigned to other Railroad work during a portion of such day, in which event reimbursement will not be required for the portion of the day during which the flagman is engaged in other Railroad work. Reimbursement will also be required for any day not actually worked by the flagman following the flagman's assignment to work on the project for which Railroad is required to pay the flagman and which could not reasonably be avoided by Railroad by assignment of such flagman to other work, even though Contractor may not be working during such time. When it becomes necessary for Railroad to bulletin and assign an employee to a flagging position in compliance with union collective bargaining agreements, Contractor must provide Railroad a minimum of five (5) days notice prior to the cessation of the need for a flagman. If five (5) days notice of cessation is not given, Contractor will still be required to pay flagging charges for the five (5) day notice period required by union agreement to be given to the employee, even though flagging is not required for that period. An additional ten (10) days notice must then be given to Railroad if flagging services are needed again after such five day cessation notice has been given to Railroad.

Section 2. LIMITATION AND SUBORDINATION OF RIGHTS GRANTED

- A. The foregoing grant of right is subject and subordinate to the prior and continuing right and obligation of the Railroad to use and maintain its entire property including the right and power of Railroad to construct, maintain, repair, renew, use, operate, change, modify or relocate railroad tracks, roadways, signal, communication, fiber optics, or other wirelines, pipelines and other facilities upon, along or across any or all parts of its property, all or any of which may be freely done at any time or times by Railroad without liability to Contractor or to any other party for compensation or damages.
- B. The foregoing grant is also subject to all outstanding superior rights (including those in favor of licensees and lessees of Railroad's property, and others) and the right of Railroad to renew and extend the same, and is made without covenant of title or ____ for quiet enjoyment.

Section 3. NO INTERFERENCE WITH OPERATIONS OF RAILROAD AND ITS TENANTS.

A. Contractor shall conduct its operations so as not to interfere with the continuous and uninterrupted use and operation of the railroad tracks and property of Railroad, including without limitation, the operations of Railroad's lessees, licensees or others, unless specifically authorized in advance by the Railroad Representative. Nothing shall be done or permitted to be done by Contractor at any time that would in any manner impair the safety of such operations. When not in use, Contractor's machinery



- and materials shall be kept at least fifty (50) feet from the centerline of Railroad's nearest track, and there shall be no vehicular crossings of Railroads tracks except at existing open public crossings.
- B. Operations of Railroad and work performed by Railroad personnel and delays in the work to be performed by Contractor caused by such railroad operations and work are expected by Contractor, and Contractor agrees that Railroad shall have no liability to Contractor, or any other person or entity for any such delays. The Contractor shall coordinate its activities with those of Railroad and third parties so as to avoid interference with railroad operations. The safe operation of Railroad train movements and other activities by Railroad takes precedence over any work to be performed by Contractor.

Section 4. LIENS.

Contractor shall pay in full all persons who perform labor or provide materials for the work to be performed by Contractor. Contractor shall not create, permit or suffer any mechanic's or materialmen's liens of any kind or nature to be created or enforced against any property of Railroad for any such work performed. Contractor shall indemnify and hold harmless Railroad from and against any and all liens, claims, demands, costs or expenses of whatsoever nature in any way connected with or growing out of such work done, labor performed, or materials furnished. If Contractor fails to promptly cause any lien to be released of record, Railroad may, at its election, discharge the lien or claim of lien at Contractor's expense.

Section 5. PROTECTION OF FIBER OPTIC CABLE SYSTEMS.

- A. Fiber optic cable systems may be buried on Railroad's property. Protection of the fiber optic cable systems is of extreme importance since any break could disrupt service to users resulting in business interruption and loss of revenue and profits. Contractor shall telephone Railroad during normal business hours (7:00 a.m. to 9:00 p.m. Central Time, Monday through Friday, except holidays) at 1-800-336-9193 (also a 24-hour, 7-day number for emergency calls) to determine if fiber optic cable is buried anywhere on Railroad's property to be used by Contractor. If it is, Contractor will telephone the telecommunications company(ies) involved, make arrangements for a cable locator and, if applicable, for relocation or other protection of the fiber optic cable. Contractor shall not commence any work until all such protection or relocation (if applicable) has been accomplished.
- B. In addition to other indemnity provisions in this Agreement, Contractor shall indemnify, defend and hold Railroad harmless from and against all costs, liability and expense whatsoever (including, without limitation, attorneys' fees, court costs and expenses) arising out of any act or omission of Contractor, its agents and/or employees, that causes or contributes to (1) any damage to or destruction of any telecommunications system on Railroad's property, and/or (2) any injury to or death of any person employed by or on behalf of any telecommunications company, and/or its contractor, agents and/or employees, on Railroad's property. Contractor shall not have or seek recourse against Railroad for any claim or cause of action for alleged loss of profits or revenue or loss of service or other consequential damage to a telecommunication company using Railroad's property or a customer or user of services of the fiber optic cable on Railroad's property.

Section 6. PERMITS - COMPLIANCE WITH LAWS.

In the prosecution of the work covered by this Agreement, Contractor shall secure any and all necessary permits and shall comply with all applicable federal, state and local laws, regulations and enactments affecting the work including, without limitation, all applicable Federal Railroad Administration regulations.

Section 7. SAFETY.

- A. Safety of personnel, property, rail operations and the public is of paramount importance in the prosecution of the work performed by Contractor. Contractor shall be responsible for initiating, maintaining and supervising all safety, operations and programs in connection with the work. Contractor shall at a minimum comply with Railroad's safety standards listed in Exhibit C, hereto attached, to ensure uniformity with the safety standards followed by Railroad's own forces. As a part of Contractor's safety responsibilities, Contractor shall notify Railroad if Contractor determines that any of Railroad's safety standards are contrary to good safety practices. Contractor shall furnish copies of Exhibit C to each of its employees before they enter the job site.
- B. Without limitation of the provisions of paragraph A above, Contractor shall keep the job site free from safety and health hazards and ensure that its employees are competent and adequately trained in all safety and health aspects of the job.
- C. Contractor shall have proper first aid supplies available on the job site so that prompt first aid services may be provided to any person injured on the job site. Contractor shall promptly notify Railroad of any U.S. Occupational Safety and Health Administration reportable injuries. Contractor shall have a nondelegable duty to control its employees while they are on the job site or any other property of Railroad, and to be certain they do not use, be under the influence of, or have in their possession any alcoholic beverage, drug or other substance that may inhibit the safe performance of any work.
- D. If and when requested by Railroad, Contractor shall deliver to Railroad a copy of Contractor's safety plan for conducting the work (the "Safety Plan"). Railroad shall have the right, but not the obligation, to require Contractor to correct any deficiencies in the Safety Plan. The terms of this Agreement shall control if there are any inconsistencies between this Agreement and the Safety Plan.



Section 8. INDEMNITY.

- A. To the extent not prohibited by applicable statute, Contractor shall indemnify, defend and hold harmless Railroad, its affiliates, and its and their officers, agents and employees ("Indemnified Parties") from and against any and all loss, damage, injury, liability, claim, demand, cost or expense (including, without limitation, attorney's, consultant's and expert's fees, and court costs), fine or penalty (collectively, "loss") incurred by any person (including, without limitation, any indemnified party, contractor, or any employee of contractor or of any indemnified party) arising out of or in any manner connected with (i) any work performed by Contractor, or (ii) any act or omission of Contractor, its officers, agents or employees, or (iii) any breach of this Agreement by Contractor.
- B. The right to indemnity under this Section 8 shall accrue upon occurrence of the event giving rise to the loss, and shall apply regardless of any negligence or strict liability of any indemnified party, except where the loss is caused by the sole active negligence of an indemnified party as established by the final judgment of a court of competent jurisdiction. The sole active negligence of any indemnified party shall not bar the recovery of any other indemnified party.
- C. Contractor expressly and specifically assumes potential liability under this Section 8 for claims or actions brought by Contractor's own employees. Contractor waives any immunity it may have under worker's compensation or industrial insurance acts to indemnify Railroad under this Section 8. Contractor acknowledges that this waiver was mutually negotiated by the parties hereto.
- D. No court or jury findings in any employee's suit pursuant to any worker's compensation act or the federal employers' liability act against a party to this Agreement may be relied upon or used by Contractor in any attempt to assert liability against Railroad.
- E. The provisions of this Section 8 shall survive the completion of any work performed by Contractor or the termination or expiration of this Agreement. In no event shall this Section 8 or any other provision of this Agreement be deemed to limit any liability Contractor may have to any indemnified party by statute or under common law.

Section 9. RESTORATION OF PROPERTY.

In the event Railroad authorizes Contractor to take down any fence of Railroad or in any manner move or disturb any of the other property of Railroad in connection with the work to be performed by Contractor, then in that event Contractor shall, as soon as possible and at Contractor's sole expense, restore such fence and other property to the same condition as the same were in before such fence was taken down or such other property was moved or disturbed. Contractor shall remove all of Contractor's tools, equipment, rubbish and other materials from Railroad's property promptly upon completion of the work, restoring Railroad's property to the same state and condition as when Contractor entered thereon.

Section 10. WAIVER OF DEFAULT.

Waiver by Railroad of any breach or default of any condition, covenant or agreement herein contained to be kept, observed and performed by Contractor shall in no way impair the right of Railroad to avail itself of any remedy for any subsequent breach or default.

Section 11. MODIFICATION - ENTIRE AGREEMENT.

No modification of this Agreement shall be effective unless made in writing and signed by Contractor and Railroad. This Agreement and the exhibits attached hereto and made a part hereof constitute the entire understanding between Contractor and Railroad and cancel and supersede any prior negotiations, understandings or agreements, whether written or oral, with respect to the work to be performed by Contractor.

Section 12. ASSIGNMENT - SUBCONTRACTING.

Contractor shall not assign or subcontract this Agreement, or any interest therein, without the written consent of the Railroad. Contractor shall be responsible for the acts and omissions of all subcontractors. Before Contractor commences any work, the Contractor shall, except to the extent prohibited by law; (1) require each of its subcontractors to include the Contractor as "Additional Insured" in the subcontractor's Commercial General Liability policy and Business Automobile policies with respect to all liabilities arising out of the subcontractor's performance of work on behalf of the Contractor by endorsing these policies with ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage; (2) require each of its subcontractors to endorse their Commercial General Liability Policy with "Contractual Liability Railroads" ISO Form CG 24 17 10 01 (or a substitute form providing equivalent coverage) for the job site; and (3) require each of its subcontractors to endorse their Business Automobile Policy with "Coverage For Certain Operations In Connection With Railroads" ISO Form CA 20 70 10 01 (or a substitute form providing equivalent coverage) for the job site.

Page 3 of 3



EXHIBIT C

TO CONTRACTOR'S RIGHT OF ENTRY AGREEMENT

INSURANCE PROVISIONS

Contractor shall, at its sole cost and expense, procure and maintain during the course of the Project and until all Project work on Railroad's property has been completed and the Contractor has removed all equipment and materials from Railroad's property and has cleaned and restored Railroad's property to Railroad's satisfaction, the following insurance coverage:

A. <u>Commercial General Liability Insurance</u>. Commercial general liability (CGL) with a limit of not less than \$5,000,000 each occurrence and an aggregate limit of not less than \$10,000,000. CGL insurance must be written on ISO occurrence form CG 00 01 12 04 (or a substitute form providing equivalent coverage).

The policy must also contain the following endorsement, which must be stated on the certificate of insurance:

- Contractual Liability Railroads ISO form CG 24 17 10 01 (or a substitute form providing equivalent coverage) showing "Union Pacific Railroad Company Property" as the Designated Job Site, and
- Designated Construction Project(s) General Aggregate Limit ISO Form CG 25 03 03 97 (or a substitute form providing equivalent coverage) showing the project on the form schedule.
- B. <u>Business Automobile Coverage Insurance</u>. Business auto coverage written on ISO form CA 00 01 10 01 (or a substitute form providing equivalent liability coverage) with a combined single limit of not less \$5,000,000 for each accident and coverage must include liability arising out of any auto (including owned, hired and non-owned autos).

The policy must contain the following endorsements, which must be stated on the certificate of insurance:

- Coverage For Certain Operations In Connection With Railroads ISO form CA 2070 10 01 (or a substitute form providing equivalent coverage) showing "Union Pacific Property" as the Designated Job Site.
- Motor Carrier Act Endorsement Hazardous materials clean up (MCS-90) if required by law.
- C. Workers' Compensation and Employers' Liability Insurance. Coverage must include but not be limited to:
 - Contractor's statutory liability under the workers' compensation laws of the state where the work is being performed.
 - Employers' Liability (Part B) with limits of at least \$500,000 each accident, \$500,000 disease policy limit \$500,000 each employee.

If Contractor is self-insured, evidence of state approval and excess workers compensation coverage must be provided. Coverage must include liability arising out of the U. S. Longshoremen's and Harbor Workers' Act, the Jones Act, and the Outer Continental Shelf Land Act, if applicable.

The policy must contain the following endorsement, which must be stated on the certificate of insurance:

- Alternate Employer endorsement ISO form WC 00 03 01 A (or a substitute form providing equivalent coverage) showing Railroad in the schedule as the alternate employer (or a substitute form providing equivalent coverage).
- D. <u>Railroad Protective Liability Insurance</u>. Contractor must maintain Railroad Protective Liability insurance written on ISO occurrence form CG 00 35 12 04 (or a substitute form providing equivalent coverage) on behalf of Railroad as named insured, with a limit of not less than \$2,000,000 per occurrence and an aggregate of \$6,000,000. A binder stating the policy is in place must be submitted to Railroad before the work may be commenced and until the original policy is forwarded to Railroad.
- E. <u>Umbrella or Excess Insurance</u>. If Contractor utilizes umbrella or excess policies, these policies must "follow form" and afford no less coverage than the primary policy.
- F. <u>Pollution Liability Insurance</u>. Pollution liability coverage must be written on ISO form Pollution Liability Coverage Form Designated Sites CG 00 39 12 04 (or a substitute form providing equivalent liability coverage), with limits of at least \$5,000,000 per occurrence and an aggregate limit of \$10,000,000.

If the scope of work as defined in this Agreement includes the disposal of any hazardous or non-hazardous materials from the job site, Contractor must furnish to Railroad evidence of pollution legal liability insurance maintained by the disposal site operator for losses arising from the insured facility accepting the materials, with coverage in minimum amounts of \$1,000,000 per loss, and an annual aggregate of \$2,000,000.

Other Requirements



- G. All policy(ies) required above (except worker's compensation and employers liability) must include Railroad as "Additional Insured" using ISO Additional Insured Endorsements CG 20 26, and CA 20 48 (or substitute forms providing equivalent coverage). The coverage provided to Railroad as additional insured shall, to the extent provided under ISO Additional Insured Endorsement CG 20 26, and CA 20 48 provide coverage for Railroad's negligence whether sole or partial, active or passive, and shall not be limited by Contractor's liability under the indemnity provisions of this Agreement.
- H. Punitive damages exclusion, if any, must be deleted (and the deletion indicated on the certificate of insurance), unless the law governing this Agreement prohibits all punitive damages that might arise under this Agreement.
- t. Contractor waives all rights of recovery, and its insurers also waive all rights of subrogation of damages against Railroad and its agents, officers, directors and employees. This waiver must be stated on the certificate of insurance.
- J. Prior to commencing the work, Contractor shall furnish Railroad with a certificate(s) of insurance, executed by a duly authorized representative of each insurer, showing compliance with the insurance requirements in this Agreement.
- K. All insurance policies must be written by a reputable insurance company acceptable to Railroad or with a current Best's Insurance Guide Rating of A- and Class VII or better, and authorized to do business in the state where the work is being performed.
- L. The fact that insurance is obtained by Contractor or by Railroad on behalf of Contractor will not be deemed to release or diminish the liability of Contractor, including, without limitation, liability under the indemnity provisions of this Agreement. Damages recoverable by Railroad from Contractor or any third party will not be limited by the amount of the required insurance coverage.



EXHIBIT D

TO CONTRACTOR'S RIGHT OF ENTRY AGREEMENT

MINIMUM SAFETY REQUIREMENTS

The term "employees" as used herein refer to all employees of Contractor as well as all employees of any subcontractor or agent of Contractor.

I. Clothing

A. All employees of Contractor will be suitably dressed to perform their duties safely and in a manner that will not interfere with their vision, hearing, or free use of their hands or feet.

Specifically, Contractor's employees must wear:

- (i) Waist-length shirts with sleeves.
- (ii) Trousers that cover the entire leg. If flare-legged trousers are worn, the trouser bottoms must be tied to prevent catching.
- (iii) Footwear that covers their ankles and has a defined heel. Employees working on bridges are required to wear safety-toed footwear that conforms to the American National Standards Institute (ANSI) and FRA footwear requirements.
- B. Employees shall not wear boots (other than work boots), sandals, canvas-type shoes, or other shoes that have thin soles or heels that are higher than normal.
- C. Employees must not wear loose or ragged clothing, neckties, finger rings, or other loose jewelry while operating or working on machinery.

II. Personal Protective Equipment

Contractor shall require its employees to wear personal protective equipment as specified by Railroad rules, regulations, or recommended or requested by the Railroad Representative.

- (i) Hard hat that meets the American National Standard (ANSI) Z89.1 ~ latest revision. Hard hats should be affixed with Contractor's company logo or name.
- (ii) Eye protection that meets American National Standard (ANSI) for occupational and educational eye and face protection, Z87.1—latest revision. Additional eye protection must be provided to meet specific job situations such as welding, grinding, etc.
- (iii) Hearing protection, which affords enough attenuation to give protection from noise levels that will be occurring on the job site. Hearing protection, in the form of plugs or muffs, must be worn when employees are within:
 - 100 feet of a locomotive or roadway/work equipment
 - 15 feet of power operated tools
 - 150 feet of jet blowers or pile drivers
 - 150 feet of retarders in use (when within 10 feet, employees must wear dual ear protection plugs and muffs)
- (iv) Other types of personal protective equipment, such as respirators, fall protection equipment, and face shields, must be worn as recommended or requested by the Railroad Representative.

III. On Track Safety

Contractor is responsible for compliance with the Federal Railroad Administration's Roadway Worker Protection regulations – 49CFR214, Subpart C and Railroad's On-Track Safety rules. Under 49CFR214, Subpart C, railroad contractors are responsible for the training of their employees on such regulations. In addition to the instructions contained in Roadway Worker Protection regulations, all employees must:

- (i) Maintain a distance of twenty-five (25) feet to any track unless the Railroad Representative is present to authorize movements.
- (ii) Wear an orange, reflectorized workwear approved by the Railroad Representative.
- (iii) Participate in a job briefing that will specify the type of On-Track Safety for the type of work being performed. Contractor must take special note of limits of track authority, which tracks may or may not be fouled, and clearing the track. Contractor will also receive special instructions relating to the work zone around machines and minimum distances between machines while working or traveling.

IV. Equipment

A. It is the responsibility of Contractor to ensure that all equipment is in a safe condition to operate. If, in the opinion of the Railroad Representative, any of Contractor's equipment is unsafe for use. Contractor shall remove such equipment from Railroad's



property. In addition, Contractor must ensure that the operators of all equipment are properly trained and competent in the safe operation of the equipment. In addition, operators must be:

- Familiar and comply with Railroad's rules on lockout/tagout of equipment.
- Trained in and comply with the applicable operating rules if operating any hy-rail equipment on-track.
 - Trained in and comply with the applicable air brake rules if operating any equipment that moves rail cars or any other railbound equipment.
- B. All self-propelled equipment must be equipped with a first-aid kit, fire extinguisher, and audible back-up warning device.
- C. Unless otherwise authorized by the Railroad Representative, all equipment must be parked a minimum of twenty-five (25) feet from any track. Before leaving any equipment unattended, the operator must stop the engine and properly secure the equipment against movement.
- D. Cranes must be equipped with three orange cones that will be used to mark the working area of the crane and the minimum clearances to overhead powerlines.

V. General Safety Requirements

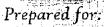
- A. Contractor shall ensure that all waste is properly disposed of in accordance with applicable federal and state regulations.
- B. Contractor shall ensure that all employees participate in and comply with a job briefing conducted by the Railroad Representative, if applicable. During this briefing, the Railroad Representative will specify safe work procedures, (including On-Track Safety) and the potential hazards of the job. If any employee has any questions or concerns about the work, the employee must voice them during the job briefing. Additional job briefings will be conducted during the work as conditions, work procedures, or personnel change.
- C. All track work performed by Contractor meets the minimum safety requirements established by the Federal Railroad Administration's Track Safety Standards 49CFR213.
- D. All employees comply with the following safety procedures when working around any railroad track:
 - (i) Always be on the alert for moving equipment. Employees must always expect movement on any track, at any time, in either direction.
 - (ii) Do not step or walk on the top of the rail, frog, switches, guard rails, or other track components.
 - (iii) In passing around the ends of standing cars, engines, roadway machines or work equipment, leave at least 20 feet between yourself and the end of the equipment. Do not go between pieces of equipment of the opening is less than one car length (50 feet).
 - (iv) Avoid walking or standing on a track unless so authorized by the employee in charge.
 - (y) Before stepping over or crossing tracks, look in both directions first.
 - (vi) Do not sit on, lie under, or cross between cars except as required in the performance of your duties and only when track and equipment have been protected against movement.
- E. All employees must comply with all federal and state regulations concerning workplace safety.

Attachment 4

Cooley Station Traffic Impact Study by TASK Engineering

Cooley Station Traffic Impact Study

Gilbert, Arizona



Trend Honses

August 16, 2006 Revised November 16, 2006



3707 North 7th Street Suite 235 Phoenix, Arizona 85014 Phone: 602-277-4224 Fax: 602-277-4228

Email: task@taskeng.net www.taskeng.net

ZN.-74

Cooley Station Traffic Impact Study

Gilbert, Arizona

Prepared for:

Jeff Cooley, Cooley Station Gilbert, Arizona



By:

TASK Engineering, Inc 3707 North 7th Street, Suite 235 Phoenix, AZ 85014

> Phone: (602) 277-4224 Fax: (602) 277-4228

August 16, 2006 REVISED November 16, 2006

TABLE OF CONTENTS

LIST OF TABLES2
LIST OF FIGURES2
INTRODUCTION
DESCRIPTION OF PROPOSED DEVELOPMENT
DESCRIPTION OF ROAD NETWORK6
TRIP GENERATION6
TRIP DISTRIBUTION
STUDY AREA TRAFFIC ASSIGNMENT
BACKGROUND TRAFFIC
TOTAL TRAFFIC
TRAFFIC ANALYSIS
DESIGN ISSUES
SIGNAL WARRANT ANALYSIS
RECOMMENDATIONS
APPENDIX A: CAPACITY SUMMARIES
APPENDIX B: TRIP DISTRIBUTION
APPENDIX C: ADJACENT TRIP GENERATION
APPENDIX D: ADJACENT PRODUCTIONS AND ATTRACTIONS
APPENDIX E: EXCERPTS FROM QUALITY/LEVEL OF SERVICE HANDBOOK
APPENDIX F: TOWN OF GILBERT STANDARD CROSS SECTIONS
APPENDIX G: TOWN OF GILBERT COMMENTS AND RESPONSE MEMO
APPENDIX H: SIGNAL WARRANT PROCEDURES

LIST OF TABLES

1	Trip Generation 8
2	Productions and Attractions9
3	Trip Distribution
4	Level of Service Criteria for Signalized Intersections
5	Level of Service Criteria for Unsignalized Intersections
6	Traffic Signal Needs Using ADT Volume Warrant (Year 2015)32
7	Traffic Signal Needs Using ADT Volume Warrant (Year 2025)33
	LIST OF FIGURES
1	Vicinity Map4
2	Schematic Site Plan
3	Key Map
4	Average Daily Study Area Traffic
5	AM (PM) Peak Hour Study Area Traffic
6	Average Daily Background Traffic (Year 2015)19
7	Average Daily Background Traffic (Year 2025)20
8	AM (PM) Peak Hour Background Traffic (Year 2025)
9	Average Daily Total Traffic (Year 2015)23
10	Average Daily Total Traffic (Year 2025)24
11	AM (PM) Peak Hour Total Traffic (Year 2025)25
12	Lane Recommendations (Year 2015)
13	Level of Service and Recommendations (Year 2025)29

INTRODUCTION

This traffic study analyzes the impacts of the proposed mixed residential/commercial development located south of Ray Road, west of Power Road, east of Wade Road, and north of Pecos Road. This particular area is a portion of a larger development, the Cooley Station Master Planned Community. It is located in Gilbert, Arizona as shown on Figure 1. A previous traffic study in this area addressed the entire master planned community at full buildout conditions. This study analyzes the southern portion of the previous Cooley Master Plan.

The purposes of this study are:

- 1. To determine the access and egress needs to serve the site,
- 2. To review driveway, access, and deceleration lane configurations on the adjacent roadway network, and
- 3. To prepare a traffic impact study for submittal to the Town of Gilbert.

Traffic conditions were analyzed for two scenarios: background traffic in Year 2015, plus full development of Cooley Station, and background traffic in the horizon Year 2025, plus full development of the site. Traffic is analyzed at accesses and on all adjacent roadways within one-half mile.

This revised report incorporates comments from the Town of Gilbert dated September 15, 2006. A copy of the comments and a response memorandum are included in Appendix G.

The conclusions of this report are listed in the final section, RECOMMENDATIONS. Appendix A contains summaries of individual capacity analyses. The following sections detail the methodology used to reach the conclusions.

DESCRIPTION OF PROPOSED DEVELOPMENT

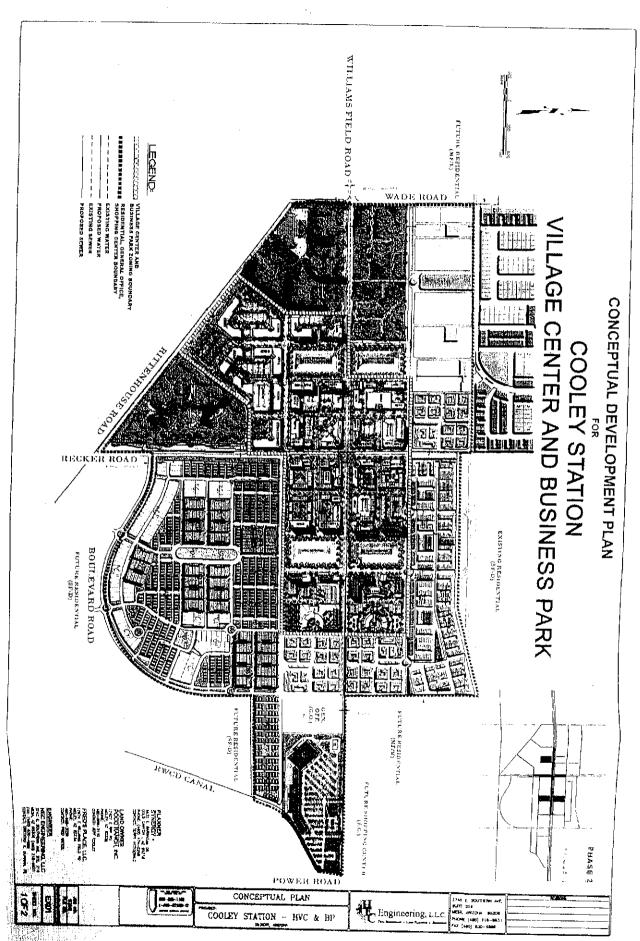
The schematic site plan for the proposed development is shown on Figure 2. It is a mixed residential and commercial development with $\pm 8,099$ dwelling units, a ± 79.74 acre Village Center, a ± 40.03 acre Business Park, a ± 21 acre K-8 School, and ± 21.2 acre shopping center parcel. The residential lots are composed of single family, town homes and apartments. The commercial site is assumed to have general retail stores and is regarded as a shopping center.

There is an existing high school, Higley High School, located on the northeast corner of Pecos Road and Recker Road. There is also an existing shopping center located on the northwest corner of Williams Field Road and Power Road. Arizona State University Polytechnic Campus is also located near the site, east of Power Road. These adjacent sites create additional traffic on the arterial roadways and will interact with the site. Currently the site area and most of the surrounding area a combination of agricultural and residential land uses, with extensive development occurring in the area.



Vicinity Map

Figure 1 Page 4 11/2006



DESCRIPTION OF ROAD NETWORK

The internal road network is shown on Figure 2.

Power Road serves as the main north-south through street, connecting the site area to the San Tan Freeway. Power Road is currently two lanes in each direction in the vicinity of the site. Power Road has signalized intersection control at Ray Road, Williams Field Road, and Pecos Road.

Recker Road is currently under construction south of Warner Road and between Williams Field Road and Pecos Road. Recker Road has signalized intersection control at Pecos Road, Ray Road and Warner Road, and is four-way STOP sign controlled at Williams Field Road. Although it is an arterial, Recker Road does not have an interchange with the San Tan Freeway, and it does not extend through to Germann Road on the south.

Williams Field Road is currently two lanes in each direction in the vicinity of the site, with a posted speed limit of 45 mph.

East of Recker Road, Ray Road is a five-lane road (two lanes westbound and three lanes eastbound). West of Recker Road, Ray Road is a six-lane road. The posted speed limit on Ray Road is 45 mph.

West of Recker Road, Pecos Road is a five-lane roadway (two lanes eastbound and three lanes westbound). East of Recker Road, Pecos Road is a six-lane roadway. The posted speed limit is 45 mph.

TRIP GENERATION

The first step in estimating traffic from the proposed development is to calculate the total estimated vehicle trips to and from the site on an average weekday after the site has been completely built out. This is called trip generation. Vehicle trips are estimated for a total average weekday and for AM and PM peak hours. Trip Generation, Seventh Edition, 2003, and the Trip Generation Handbook, 2nd Edition, June 2004, published by the Institute of Transportation Engineers (ITE), were the sources for the trip rates used in this study.

For a large area such as this, some trips will have both their origin and their destination end within the study area. These are referred to as "internal" trips. Other trips will have one end, either origin or destination, in the site and the other end outside the site. These are referred to as "external" trips. The arterial street approaches to the site that these external trips use are referred to as "external stations."

Each trip has two trip ends. The trip Production end represents the end of the trip where the decision to make a trip is made. Generally, this is the home end of a home-based trip. The Attraction end of the trip is generally the end where the trip maker engages in some activity, such as employment, shopping, education or recreation.

l	E G
ĺ	nerati
	9
ı	Ë
ı	

							L		ř	Trin Rafes					Total		1
č					Ŀ	L	4	H	•	ŀ:	% In AM	% in PM	Weekday	AM In	AM Out	PM in 8	PM Out
Cooley Station	-		Parcel Type	Units	Acres A	힑	╗	<u></u>	ţ	+-	750/	Ü	6.058	611	356	403	237
TAZ	Parcel #	30	Decidential (5.8 DI)/Acre)	DUs	79.13	633 2	4	9.57	0.75	1.0.1	4270	200	0000	3 -	35.4	401	235
_		223	The state of the s	Dilis	78.84	630 2	210	9.57	0.75	1.0.1	25%	67%	0,029	<u>-</u>	5 6	F	3.8
2	2	226	Kesidential (3-6 DO/Acte)	25.0	16.03	\vdash	230	5,86	0.44	0.52	1.1%	67%	(15,1)	= :	70		5
-	6	230	Residential (8-14 DU/Acre)	5 5	12.44	╁	ļ	5.86	0.44	0.52	17%	%19	1,102	4.	â	2	75
	4	233	Residential (8-14 DU/Acre)	500	20.70	+	+	6.72	15.0	0.62	70%	65%	5,000	92	304	200	10
	~	238	Residential (14-25 DU/Acre)	DOS	97.79	-	+	6.77	-	0.62	20%	65%	1,149	1.1	2	69	-
	49	,	Village Center (Residential)	DUs	-+	1	-	270	0.67	0.46	88%	1.7%	426	26	æ	7	36
•	R.9	,	Viallge Center (General Office)	TGSF		4	-	16.36	100	7 00	%19	48%	5,483	19	96	242	292
٥	9	,	Village Center (Commercial)	TGSF	2.20 7	71.7459	200	1,00		,	,	,	7,058	152	128	318	335
	3	24]	Sum Village Center Parcel 6	,	'	֓֞֝֝֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	, 60	673	150	0.62	20%	%59	1,149	۲١	20	69	37
,	ΔĽ	,	Village Center (Residential)	DUs	+	4	+	34.0	2.90	0.46	88%	17%	426	96	*	7	36
	ar.	,	Vialige Center (General Office)	TGSF	+	1	1		9	8	61%	48%	5,483	79	50	242	262
-	32		Village Center (Commercial)	TGSF	2.20	71.9439	+	77.07		,	,	1	7,058	152	128	318	335
	-	245	Sum Village Center Parcel 7		,	+			150	0.62	20%	65%	4,019	9	244	243	30
3	•	248	Residential (14-25 DU/Acre)	DUs	73.54	+	\downarrow	4 Th	150	0.62	20%	65%	4,361	99	592	262	<u>4</u>
	0	250	Residential (14-25 DU/Acre)	DUs	25.87	+	077	70.0		0.52	17%	67%	2,145	27	134	128	63
2 3	0.	15%	Residential (8-14 DU/Acre)	DUs	2621	+	057	00.0	7.0	101	75%	63%	7,493	147	440	498	293
2		254	Residential (5-8 DU/Acre)	DUs	99.36	+	017	2		80.0	%55	45%	774	139	113	2/2	35
=		156	K-8 School	Students	21.00	+	075	67.1	24.0	2 -	25%	63%	6.077	119	357	404	237
12	71	250	Residential (5-8 DU/Acre)	DUs	79.40	+	017	75.6	5.7	90.2	%19	48%	10,447	142	61	466	504
2	2 2	692	Commercial	TGSF	21.20	194	+	25.65	13.0	0 63	70%	65%	1,673	25	102	90	7.5
4	*	310	Residential (14-25 DU/Acre)	DUs	9.97	+	077	7/70		290	20%	%59	3,400	52	506	204	110
<u>~</u>	CI V	217	Village Center (Residential)	DUs		1	270	7/70	200	3 3	%88	17%	1,067	144	20	22	108
9.	You.		Viellae Center (General Office)	Ì		4	2	3.77	0.58	28.4	% (9	48%	11.159	151	96	498	539
ياءِ	gor		Village Center (Commercial)	TCSF	6.57	214.688	820	87.78		6		,	15,627	347	322	724	757
0	200	280	Sum Village Center Parcel 16		,	,	2 5	,	,	690	30%	65%	1,673	22	102	8	54
,	2 5	282	Residential (14-25 DU/Acre)		26.6	543	077	27.0	5	0.63	20%	65%	3,407	5.2	207	204	0
:	481		Village Center (Residential)		\rightarrow	203	37	27.7	800	0.46	88%	17%	1,067	144	20	22	801
× :	881		Vialige Center (General Office)		+	282.997	2 5	27.7	2 -	4.83	%19	48%	11,159	151	96	498	539
9	3.		Village Center (Commercial)	TGSF	6.57	214.088	270			,	,	ì	15,633	347	323	724	757
8	8	283	Sum Village Center Parcel 18		,	1	֓֞֜֜֜֜֜֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓	, , ,	0.44	0.52	17%	%19	2,086	27	130	124	19
	0	286	Residential (8-14 DU/Acre)	1	25.44	336	2 2	8 F	150	0.67	20%	%59	1,290	20	7.8	77	42
2	000	787	Residential (14-25 DU/Acre)		7.68	26	077	7, 5	120	0.67	20%	959	1,667	25	01	8	22
707	3 5	290	Residential (14-25 DU/Acre)		9.93	248	077	27.0	17.7	62.1	84%	23%	8,103	763	145	188	631
7 8	5.0	162	Business Park	TGSF	40.00	53	2/2	2,77	0.70	0.46	%88	17%	322	42	9	S	56
77	1 2	203	General Office	TGSF	6.20	3	2	4.73	3				117,006	5,969	4,373	6,100	5,270
57	3		Sum of DUs			8,099											

3

Ū

7

7

11,4

notey Station Traffic Impact Study	Table i	Page 8	11/2006
Cooley Station T.			

				-										-		ſ
Cooley Station	Į,				Į.	L	+	Н	٦,	¦ -	100 1 100			ŀ		
TAZ	Parcel #	TCID	Parcel Type	Units	-1	<u>-</u>	+	¥	1	\$	% 10 L V	weekday		_	┿	10 Tr.
_	-	223	Residential (5-8 DU/Acre)	S		-1	4	$\frac{1}{1}$	$\frac{1}{1}$	25%	6.1%	6,058	<u></u>	356	£	7.57
2	2	226	Residential (5-8 DU/Acre)	DOs	_	630 2	_	9.57 0.75	101	25%	63%	6,029	31	354	\$ [0]	235
-	3	230	Residential (8-14 DU/Acre)	sha	16.02	224 230		5.86 0.44	-	17%	67%	1,313	17	87	82	38
4	4	233	Residential (8-14 DU/Acre)	sna DOs	13.44	188 25			0.52	17%	67%	1,102	17	69	65	32
~	2	238	Residential (14-25 DU/Acre)	s∩a	29.78	744 220	_	6.72 0.51	0.62	20%	65%	2,000	7.6	304	300	191
9	6A		Village Center (Residential)	DUs	10.01	171 220	ļ	6.72 0.51	0.62	70%	65%	1,149	1,1	70	69	37
9	89		Vialize Center (General Office)	TGSF	┝	94.8377 710	_	4.49 0.67	0.46	%88	17%	426	56	80	7	36
	QC.	?	Village Center (Commercial)	TGSF	÷	71.9459 8.	820 74	76.21 1.79	7.00	61%	48%	5,483	79	20	242	262
,	9	241	Sum Village Center Parcel 6	,	?	,		~	, 	-	;	7,058	751	128	318	335
7	7.8	2	Village Center (Residential)	DQ:	10,01	171 220	L	6.72 0.51	0,62	20%	%\$9	1,149	17	7.0	89	37
	E.	,	Viallge Center (General Office)	TGSF	2.90	94.8377 710	_	4.49 0.67	0.46	88%	11%	426	96	∞ .	7	36
	22	2	Village Center (Commercial)	TGSF	2.20 71	71.9459 820		179		%19	48%	5,483	79	20	242	292
	2	245	Sum Village Center Parcel 7	,	,	,		1	,	1	¥	7,058	152	128	318	335
۵	×	248	Residential (14-25 DU/Acre)	sna	23.94	598 Z	_	6.72 0,51	0.62	20%	65%	4,019	19	244	241	130
	6	250	Residential (14-25 DU/Acre)	pUs	L	649 27	220 6	6.72 0.51	0.62	20%	65%	4,361	99	597	262	141
2	01	251	Residential (8-14 DU/Acre)	DUs	ļ_	366 230		5.86 0.44		17%	%19	2,145	27	134	128	63
=		254	Residential (5-8 DU/Acre)	DUs	96 36	783 210	_	9.57 0.75	1.01	25%	%69%	7,493	:47	440	498	293
-12	12	256	K-8 School	Students	Ļ.	600 520		1.29 0.42	0.28	55%	45%	774	139	113	76	26
		259	Residential (5-8 DU/Acre)	DUS		635 2	210 9	27.0	101	25%	63%	6,077	6=	357	404	237
14	41	269	Commercial	TGSF	21.20	194 820		53.85 1.20	5.00	61%	48%	10,447	142	16	466	504
5	5	270	Residential (14-25 DU/Acre)	DUs	76.6	249 220		6.72 0.51	0.62	20%	65%	1,673	25	102	<u>5</u>	24
91	P P		Village Center (Residential)	DUs	29.87	506 220		6.72 0.51	0.62	20%	65%	3,400	32	506	20%	9
91	16.R		Viellee Center (General Office)	TGSF	╀	7 792.997	-	3.77 0.58	H	88%	17%	1,067	144	20	22	108
9,	Je L		Village Center (Commercial)	TGSF	6.57 21	214.688 87	820 5	51.98 1.15	4.83	%19	48%	11,159	151	96	498	539
-	293	280	Sum Village Center Parcel 16		╄	[,		1	,	1	_	15,627	347	322	724	757
1.2	1	282	19	DUs	L	249 220		6.72 0.51	0.62	70%	%59	1,673	25	102	100	54
= =	I.R.A		Village Center (Residential)	DUS	29.87	L		6.72 0.51	0.62	20%	65%	3,407	25	207	204	110
2 2	183		Vialige Center (General Office)	TGSF	8.66 28	782,997	710 3	3.77 0.58	0.46	%88	17%	1,067	144	70	22	108
8	180		Village Center (Commercial)	TGSF	6.57 21	214,688 87	820 5	51.98 1.15	4.83	%19	48%	11,159	151	98	438	539
	~	783	Sum Village Center Parcel 18	ì		!		1	,	`	!	15,633	34.7	323	724	757
0	61	285		Dis	25.44	356 230		1.86 0.44	0.52	17%	67%	2,086	27	130	124	<u> </u>
	20	787	Residential (14-25 DU/Acre)	DUs	7.68	192 220		6.72 0.51	0.62	20%	65%	1,290	70	8/	-	42
1,0	1,0	790	Residential (14-25 DU/Acre)	DÜs	56.6	248 22		6.72 0.51	0.62	20%	65%	1,667	25	[<u>0</u>	2	54
2.2	22	791	Business Park	TGSF	Ļ	635 770		12.76 1.43	1.29	84%	23%	8,103	763	145	88	13
2,7	73	293	Ceneral Office	TGSF	6.20	7.1		4.73 0.70		88%	17%	322	42	9	~	97
2	1		Sum of DUs		╀	8,099						900'411	7,969	4,373	6,100	5,270
					1	Ì					•				İ	

111

Trip Generation



Cooley Station																	
A located	TC ID	Parcel Tyne	Units	Acres	Amount	U.C.	Amount L.U.C. % Attractions	Weckday	AM III	AM Out	PM In	PM Out	Weckday	AM In	AM Out	PM In	PM Out
rated #	-	Residential (5-8 DU/Acre)	DDs		633	210	2%	5,755	113	338	383	225	303	9	18	70	12
- [922	Residential (5-8 DU/Acre)	DUs	78.84	630	210	5%	5,728	112	337	381	224	301	9	<u>~</u>	20	12
2 8	230	Residential (8-14 DL/Acre)	200	16.02	224	230	5%	1,247	91	78	74	37	99	-	4	4	2
4	233	Residential (8-14 DU/Acre)	S)O	13.44	881	230	5%	1,047	13	65	3	31	25	~-		-	2
	738	Residential (14.25 DU/Acre)	ña	29.78	744	220	5%	4,750	7.5	288	285	153	250	4	15	15	∞
, PA9	257	Village Center (Residential)	nga	10.01	121	220	5%	1,092	17	99	65	35	57	-	3	3	7
g g	7	Vialue Center (General Office)	TOSF	Η-	94.8377	710	%09	02.1	22	Э	3	14	255	75	5	4	22
000	1	Village Center (Commercial)	TGSF		71.9459	820	%09	2,193	31	20	26	105	3.290	47	30	145	157
3 4	241	Sum Village Center Parcel 6	,	2	,	1	ì	3,455	70	68	165	154	3,603	82	38	153	181
74	,	Village Center (Residential)	S S	10'01	171	220	5%	1,092	17	99	65	35	57	-	6	Е.	2
T.	1	Viallae Center (General Office)	TGSF	2.90	94.8377	210	%09	170	22	3	г.	74	255	34	S	4	22
100	2	Village Center (Commercial)	TCSF	2.20	71.9459	820	%09	2,193	31	20	26	105	3,290	47	30	145	157
۔ اُذِ	245	Sum Village Center Parcel 7	1	,	?	į	ì	3,455	70	68	165	154	3,603	28	38	155	181
~	248	Residential (14-25 DU/Acre)	DUs	23.94	298	220	2%	3,818	28	232	229	123	201	'n	12	12	9
	250	Residential (14-25 D11/Acre)	DUs	25.97	649	220	2%	4,143	63	252	248	134	218		=		٢
5	751	Residential (8-14 DU/Acre)	DUs	26.21	366	230	%5	2,038	26	127	121	9	107		7	9	
=	254	Residential (5-8 DU/Acre)	DUs	96.66	783	210	5%	7,119	139	418	473	278	375		22	25	5
2	256	K-8 School	Students	21.00	009	520	85%	116	21	17	=	4	658	8=	8	54	73
1	056	Residential (5-8 DU/Acre)	DUG	79.40	635	012	5%	5,773	113	339	384	225	304	9	∞	92	12
14	569	Commercial	TGSF	21.20	194	820	20%	5,223	71	45	233	252	5,223	71	45	233	252
14	270	Residential (14-25 DU/Acre)	DÜ	6.67	249	220	2%	1,590	24	97	95	2	84	-	2	5	
164		Village Center (Residential)	DUs	29.87	206	220	5%	3,230	49	-28	194	5	130		2	2	5
168		Viallee Center (General Office)	TGSF	9.60	282,997	710	%09	427	58	8	6	43	980	87	2	2	ŝ
160		Village Center (Commercial)	TGSF	6.57	214.688	820	%09	4,464	8	39	199	216	9693	06	288	565	324
16	280	Sum Village Center Parcel 16	1	1	}	1	,	8,121	167	243	402	363	7,506	28	2	322	25.
17	282	Residential (14-25 DU/Acro)	DUs	76'6	249	220	5%	1,590	74	97	25	31	84		Λ):	\ \ !	7
18A		Village Center (Residential)	DUs	29.87	507	220	5%	3,237	49	197	194	502	170	5	2	= :	0
188		Viallge Center (General Office)	TGSF	8.66	282.997	710	50%	533	72	2	=	24	533	7.2	2 9	= :	4,
180		Village Center (Commercial)	TGSF	6.57	214.688	820	20%	5,580	75	48	249	270	5,580	75	48	249	07.7
8.	283	Sum Village Center Parcel 18	1	2	,	7		9,350	197	255	454	428	6.284	20	88	0/7	47.4
01	285	Residential (8-14 DU/Acre)	ans	25.44	356	230	5%	1,982	25	124	81	288	104	_	-	0	Ś
2	287	Residential (14-25 DU/Acre)	ρΩs	7.68	192	220	2%	1,226	6	74	74	\$	\$9	-	4	4	7
1	300	Residential (14-25 DU/Acre)	SQC S	6.93	248	220	5%	1,583	24	96	56	51	83	-	S	2	
1	102	Business Park	TGSF	40.00	635	770	20%	4,051	381	73	16	315	4,051	381	5	\$	315
77	167	General Office	TGSF	6.20	88	710	20%	161	21	3	3	13	161	21	Э	3	13
	227							010.00	0,0	2 1116	1171	3 47 5	32 600	1 1 10	202	1 45.6	1 835

Cooley Station Traffic Impact Study
Table 2
Page 9
11/2006

TCAD ID is the ID unique to the TransCAD modeling program used to identify the endpoint associated with each parcel.

Parcel Type describes the parcel use.

Units specifies the units of land use used for generating trips. "Thousands of Gross Square Feet" is abbreviated TGSF. Dwelling units is abbreviated DUs.

Amount is the number of units in the parcel (i.e. 544 Thousand Gross Square Feet or 134 Dwelling Units).

LUC is the ITE Land Use Code. It refers to the section of the ITE manual from which the trip rates were obtained.

Rates present the number of daily, AM peak hour and PM peak hour vehicle trips to and from the subject land use per unit.

Percent In is the percentage of AM and PM vehicle trips arriving inbound at the land use. The remaining percent of trips are leaving outbound. For instance, 25 percent of AM peak hour trips are arriving at a single family home, and the remaining 75 percent are leaving the home. For daily trips, it is assumed that 50 percent are inbound trips and 50 percent are outbound trips.

Trips are the calculated number of trips. They are calculated as the amount times the rate times the percent inbound or outbound.

Productions and Attractions for adjacent developments can be found in Appendix D. Detailed trip generation tables for the adjacent developments are shown in Appendix C. The total internal Productions for the study area are more than the total internal Attractions. The difference is Attractions to external stations. These are trips between the study area and other locations in the metropolitan region.

TRIP DISTRIBUTION

Trip distribution is the process of assigning a starting location for each inbound trip to the site and an ending location for each outbound trip. Daily, AM peak hour and PM peak hour trips are distributed separately.

External trips are split between a number of external stations, which represent arterial approaches to the study area. Total external trip Attractions are calculated as the difference between internal Productions and internal Attractions. Specifically;

Total Daily A(Ext) = Total Daily P(Int) - Total Daily A(Int)
Total AM-In A(Ext) = Total AM-Out P(Int) - Total AM-In A(Int)
Total AM-Out A(Ext) = Total AM-In P(Int) - Total AM-Out A(Int)
Total PM-In A(Ext) = Total PM-Out P(Int) - Total PM-In A(Int)
Total PM-Out A(Ext) = Total PM-In P(Int) - Total PM-Out A(Int)

Where,

Daily = ADT trip generation

A = Attractions
P = Productions
Int = Internal zone
Ext = External station

Site trips were distributed by direction proportionally to the sum of Year 2020 population and employment forecasts within ten miles of the center of the site. These projections were obtained from Year 2020 Population and Employment projections by the Maricopa Association of Government (MAG). These values are shown in Table 3. A worksheet of MAG data for the site is included in Appendix B.

Table 3
Trip Distribution Percentages
Cooley Station Traffic Impact Study

Direction	Trip Distribution Percentage
Higley Road, North	20%
Recker Road, North	2%
Power Road, North	2%
San Tan Freeway, East	15%
Ray Road, East	3%
Williams Field Road, East	5%
Pecos Road, East	1 %₀
Power Road, South	2%
Higley Road, South	4%
Pecos Road, West	5%
Williams Field Road, West	10%
Ray Road, West	10%
San Tan Freeway, West	21%
Total	100%

The next step is to run the TransCAD program gravity model to create tables of trip origins and destinations. The gravity model is the most widely used trip distribution model. This model explicitly relates flows between zones to inter-zonal impedance to travel.

The assumption behind the gravity model is that the number of trips produced at zone i that are attracted to zone i is proportional to:

- The number of trips produced in zone i
- The number of trips attracted to zone j
- A function of the relative impedance between the zones, called impedance.

For this study the impedance between zones i and j is defined as:

$$F(c_{ij}) = (1/c_{ij}) \times e^{-0.01(cij)},$$

Where, c_{ij} = travel time between zones i and j, which is distance times 60 divided by miles per hour. For external stations, a distance to the average location for trips going in that direction was added to the calculation of distance. The final step is to convert the trip matrices from the gravity model into trip matrices ready to assign to the network.

There are three trip matrices for assignment:

- 1. Average Daily Traffic (ADT) This is the daily trip table, balanced so that trips from zone i to zone j equal trips from zone j to zone i.
- 2. AM Trip Table The trip table made with AM inbound Productions and outbound Attractions is transposed and added to the trip table made with AM outbound Productions and inbound Attractions.
- 3. PM Trip Table The trip table made with PM inbound Productions and outbound Attractions is transposed and added to the trip table made with PM outbound Productions and inbound Attractions.

STUDY AREA TRAFFIC ASSIGNMENT

A traffic assignment was performed with the use of TransCAD transportation software. Vehicle trips between each origin and destination were determined as outlined above and combined in an origin-destination (O-D) matrix in TransCAD. A graphical representation of the transportation network servicing the study area was also created in TransCAD. The flows of traffic for each O-D pair in the matrix were loaded onto the transportation network. The number of trips assigned to a roadway is based upon the travel time each path could carry.

A User Equilibrium Capacity Restraint method was used to assign the trips within TransCAD. Capacity Restraint recalculates travel time on roadways based on the volume and level of congestion on them. The program then reassigns trips using the new travel times. This is repeated up to 20 iterations to achieve an equilibrium solution. Background traffic is included for the recalculation of travel time in each iteration.

User equilibrium uses an iterative process to achieve a convergent solution in which no traveler can improve his or her travel time by shifting routes.

In each iteration, network link flows are computed, which incorporate link capacity restraint effects and flow-dependent travel times. The formulation of the User Equilibrium problem as a mathematical program and the Frank-Wolf solution method employed in TransCAD are described in the TransCAD user manual, Technical Notes section in Chapter 9.

This process was first completed for the entire study area with full access on all site roadways and accesses. Figure 3 presents an area key map for the study area. Figure 4 presents the study area average daily traffic for full buildout, and Figure 5 presents AM and PM peak hour turning movements at critical intersections, expected to be traveling to and from the study area.

As mentioned in the TRIP GENERATION section, the study area includes the Cooley Station development, and several adjacent parcels. The adjacent parcels are the adjacent Park, the Dibella commercial and residential property and the adjacent existing high school.

BACKGROUND TRAFFIC

Background traffic is the amount of traffic that would be on area roads in the future, if the proposed development were not built.

For Year 2025, background values on the roadways were determined by subtracting the study area traffic, as described in the previous section, from the Year 2025 MAG projections for the area.

For Year 2015, the background traffic for Year 2025 calculated above was then taken and interpolated between existing counts and Year 2025 to obtain Year 2015 background volumes.

For Year 2025, average daily traffic was converted to hourly volumes using the following formula:

 $DDHV = AADT \times K \times D$

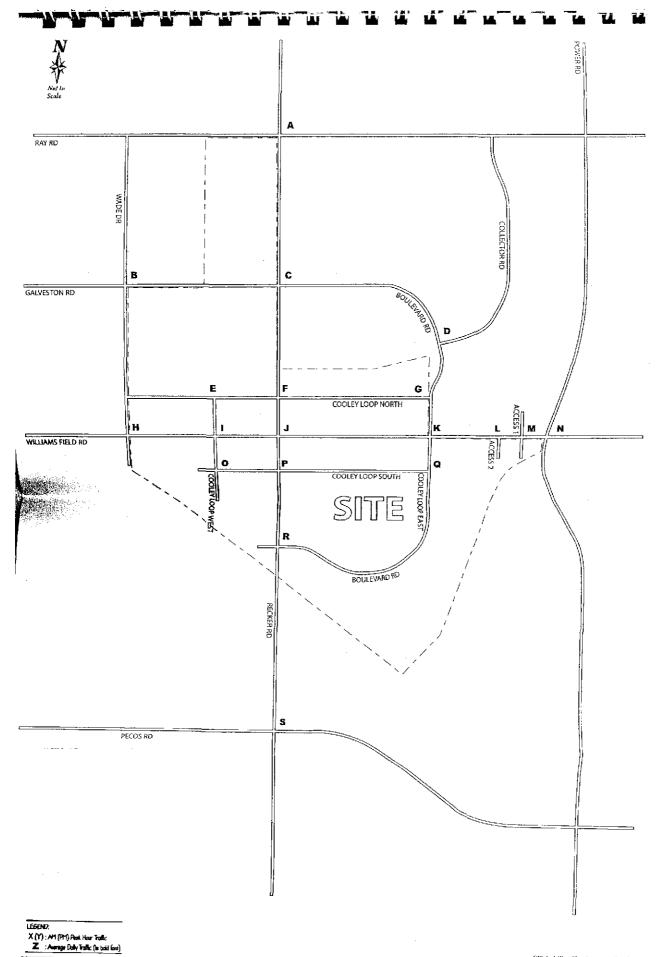
Where: AADT = forecast average annual daily traffic (vpd)

DDHV = directional design hourly volume (vph)

K = percent of AADT occurring in the peak hour, and

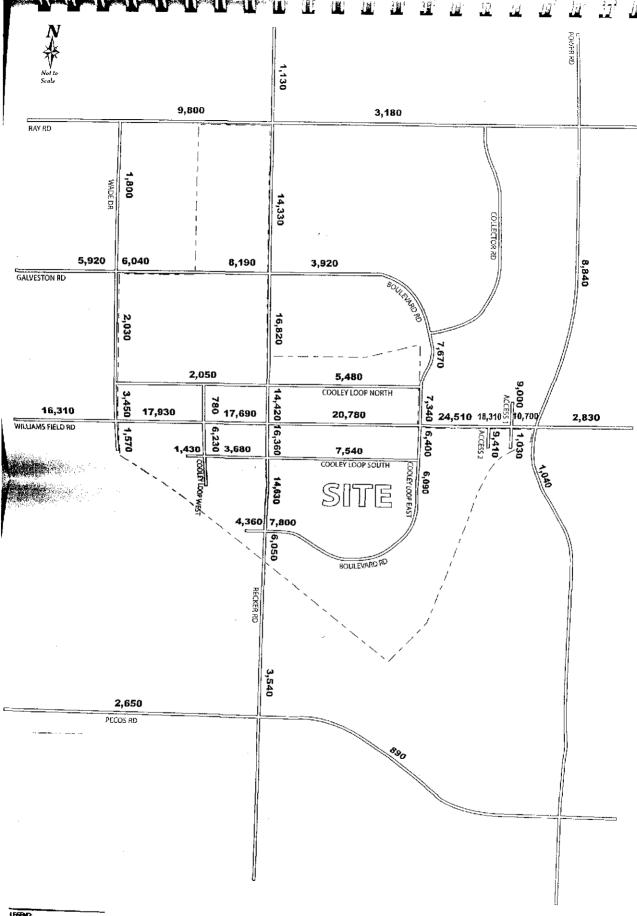
D = percent of peak-hour traffic in the heaviest direction.

A K value of 0.09 was used for the roadways. A D value of 60 percent was used, going westbound and northbound during the AM peak hour, and eastbound and southbound during the PM peak hour. To estimate total background AM and PM peak hour turns, a nonlinear programming procedure was developed. This inputs the approach and departure volumes determined above and a starting estimate of percent right and left turns for each approach.

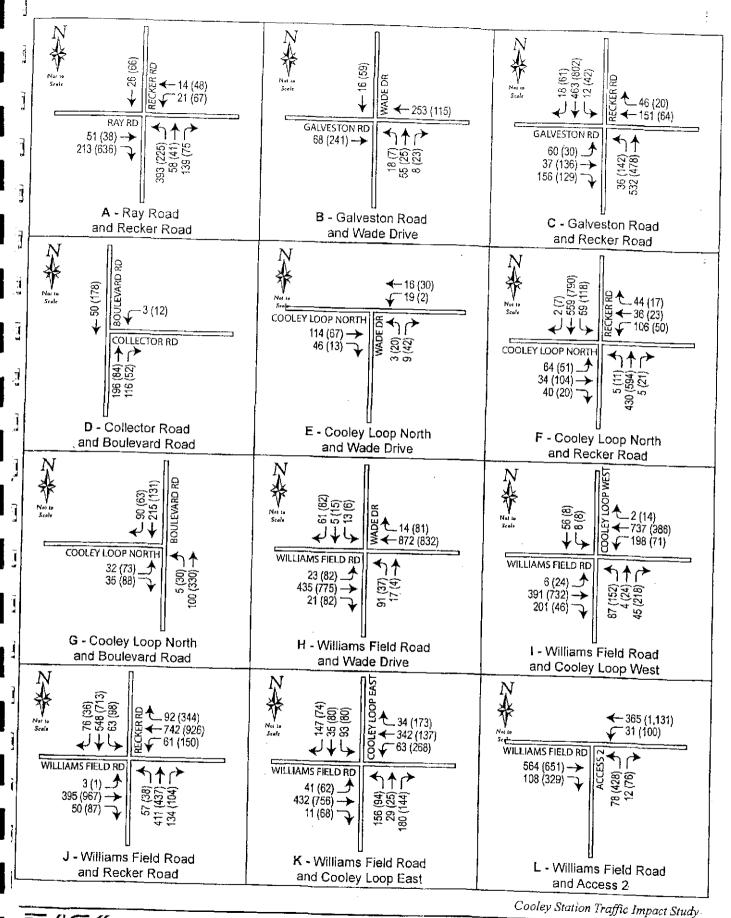


TASK

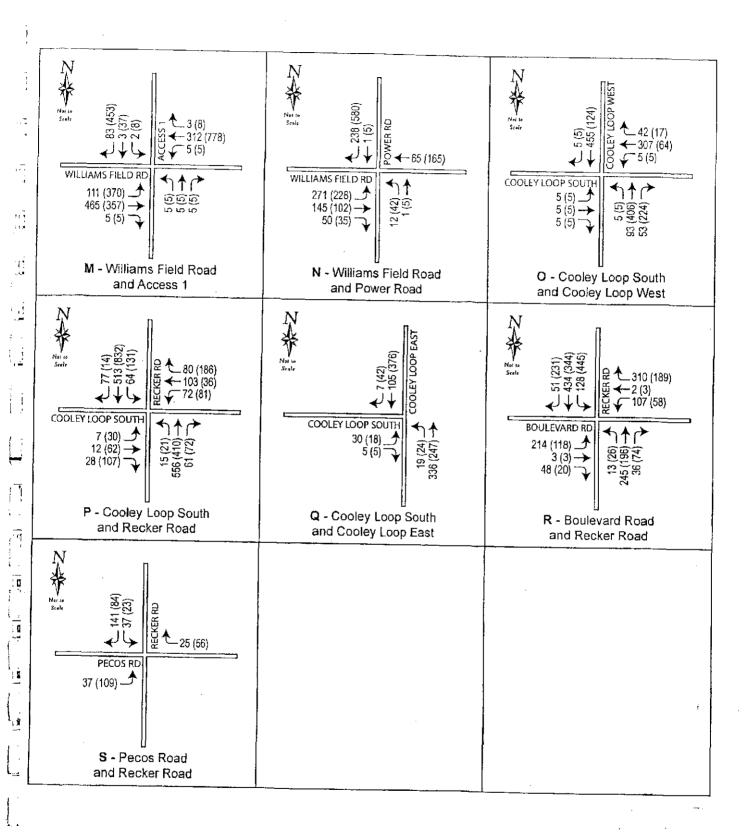
[Title] Traffic Impact Study



Cooley Station Traffic Impact Study







ENGINEERING

Cooley Station Traffic Impact Study

This procedure produces turn volumes, which minimizes the following objective function:

Min.
$$K = \Sigma (V_E - V_C)^2 + 0.5 \times \Sigma (T_E - T_C)^2$$

Subject to:

77

7.1

Total approach volume = Total departure volume

Approach volumes are held constant

All turns are non-negative

Approach and departure volumes are summation of turn volumes

Where:

V_E, V_C = Estimated and output approach and departure volumes

 T_E , T_C = Estimated and output turning volumes for each approach.

Before running the optimization routine, total approach and departure volumes are balanced. This approach was used to estimate background traffic for Year 2025.

The resulting background average daily traffic for Year 2015 is shown on Figure 6, while the resulting average daily traffic for Year 2025 is shown on Figure 7, with AM and PM peak hour turning movements for Year 2025 shown on Figure 8.

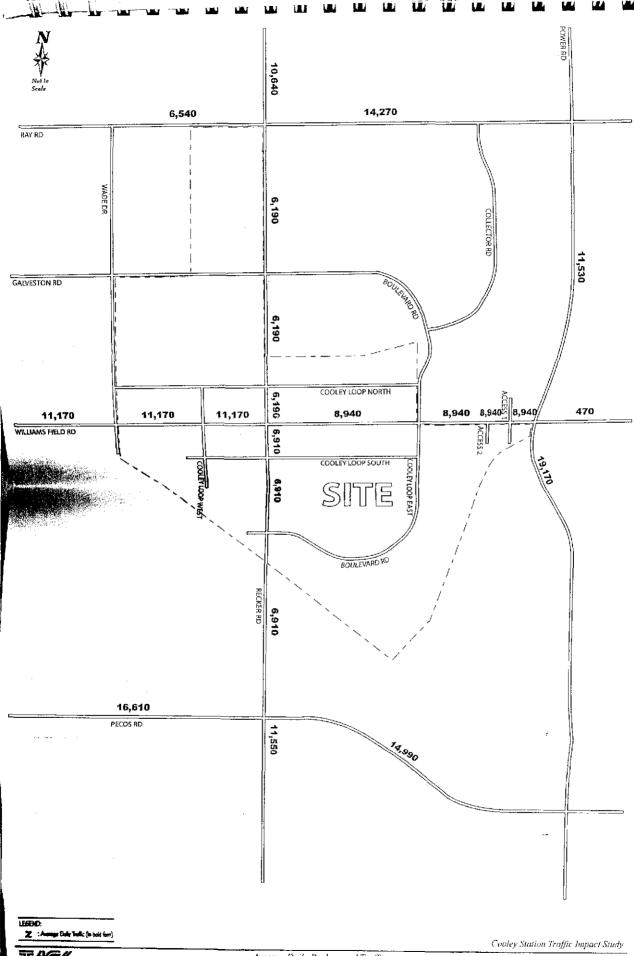
TOTAL TRAFFIC

Total traffic is the sum of the site traffic plus the background traffic. Total estimated Year 2015 average daily traffic is shown on Figure 9. Total estimated average daily traffic for Year 2025 is shown on Figure 10, with AM and PM peak hour turning movements shown on Figure 11 for Year 2025.

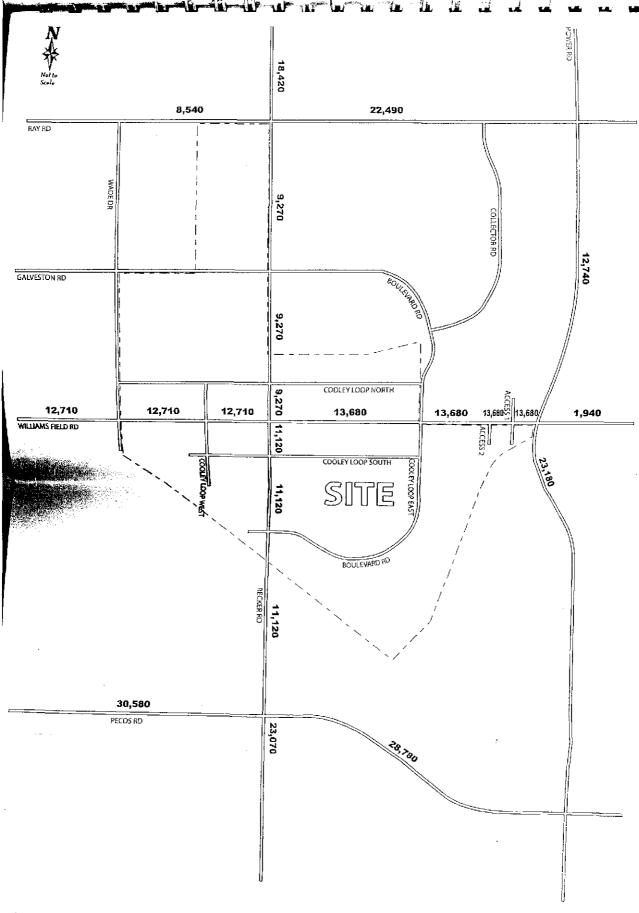
TRAFFIC ANALYSIS

For Year 2015, generalized average daily service volumes by level of service (LOS) were used to estimate needed lanes. These daily service volumes were taken from Table 4-2 of Quality/Level of Service Handbook, prepared by State of Florida Department of Transportation, 2002. Excerpts from this publication are found in Appendix E. Level of service C was used to determine the break point between two-lane and four-lane roads, and Level of service D volume was used to determine the break between four-lane and six-lane roads. Roads operating at the low end of the range of service volumes are not recommended to have medians. These are minor arterials or collectors. The resulting recommended lanes for Year 2015 are found on Figure 12.

For Year 2025, the critical intersections were analyzed using the methodologies presented in the *Highway Capacity Manual*, 2000 Edition, and were evaluated using HCS 2000 Software. Capacity analysis was completed for both AM and PM peak hours for total Year 2025 traffic including full site buildout conditions.



Average Daily Background Traffic (Year 2015)



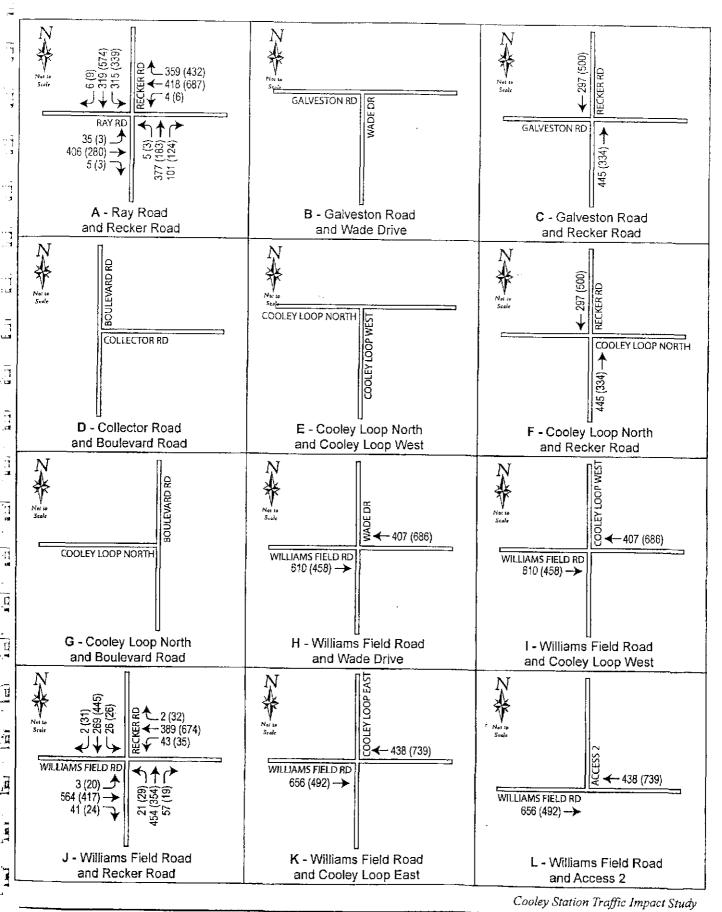
UE600:

Z: Amongo Dody Traffic (in bodd fore)

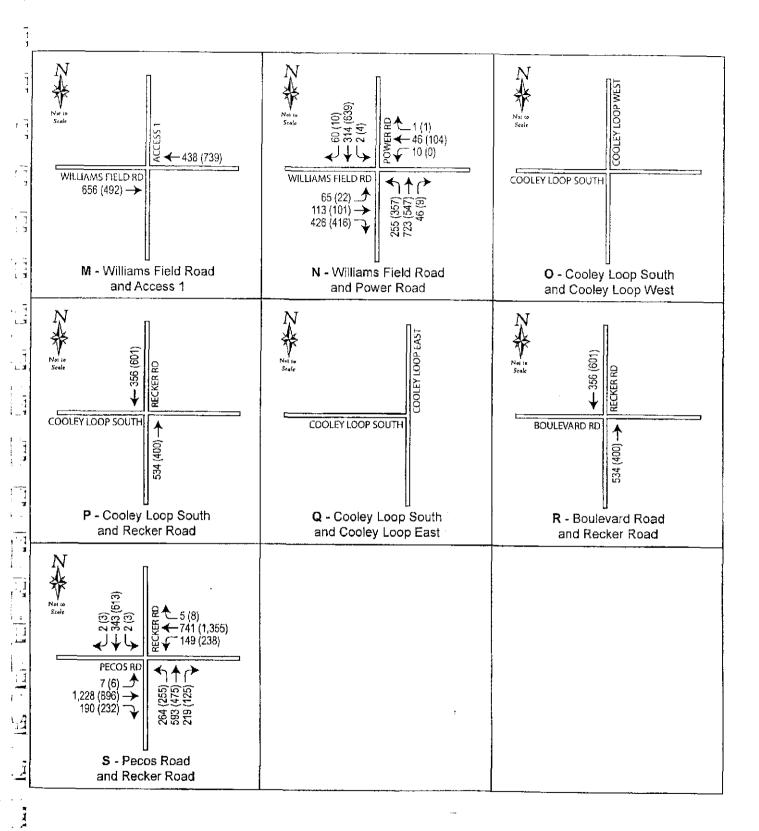
TASK

Average Daily Background Traffic (Year 2025) Cooley Station Traffic Impact Study

Figure 7 Page 20 11/2006

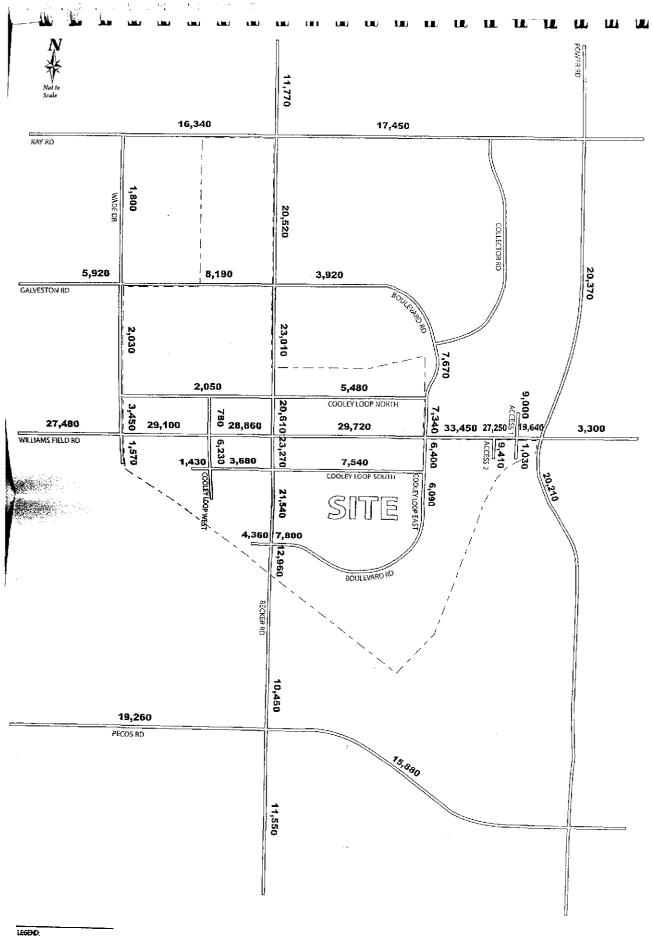






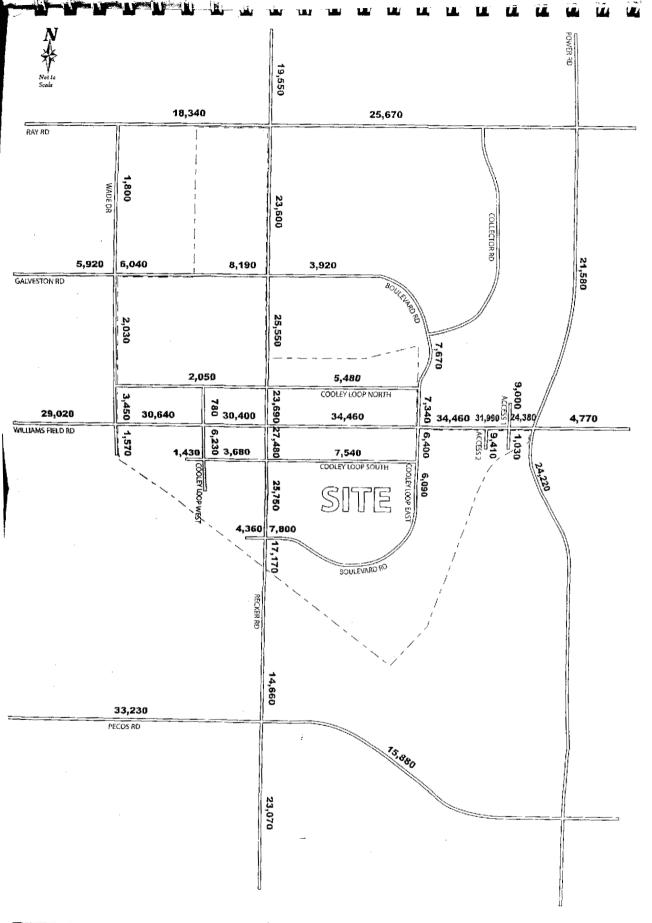
Cooley Station Traffic Impact Study





Z: Amongo Doby Traffe (in book for

Cooley Station Traffic Impact Study

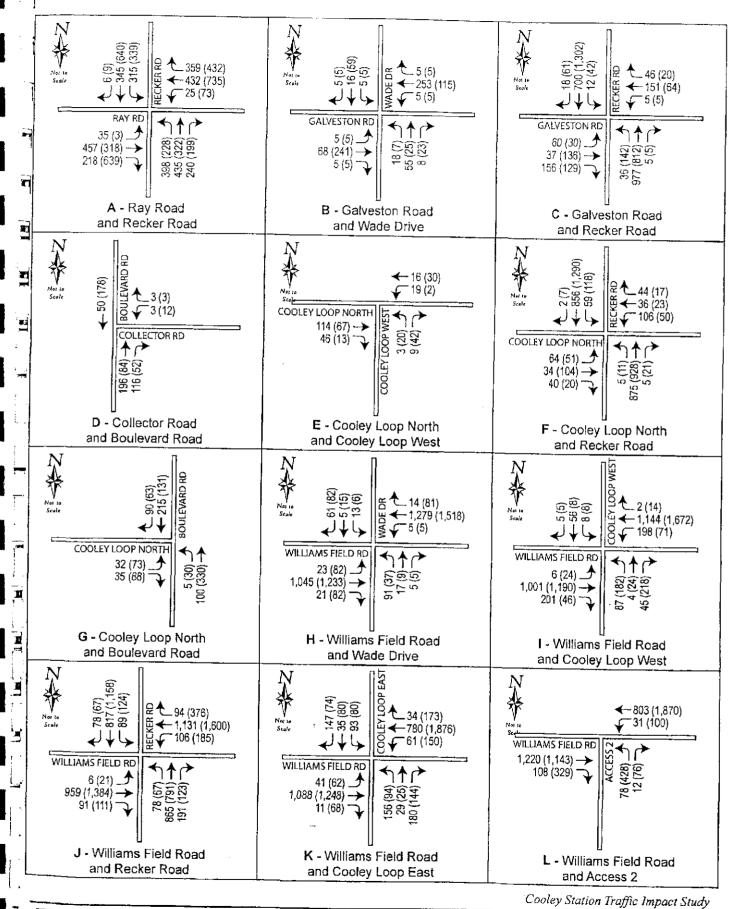


LEGENO.

Z : Average Daily Traffic (In bold font)

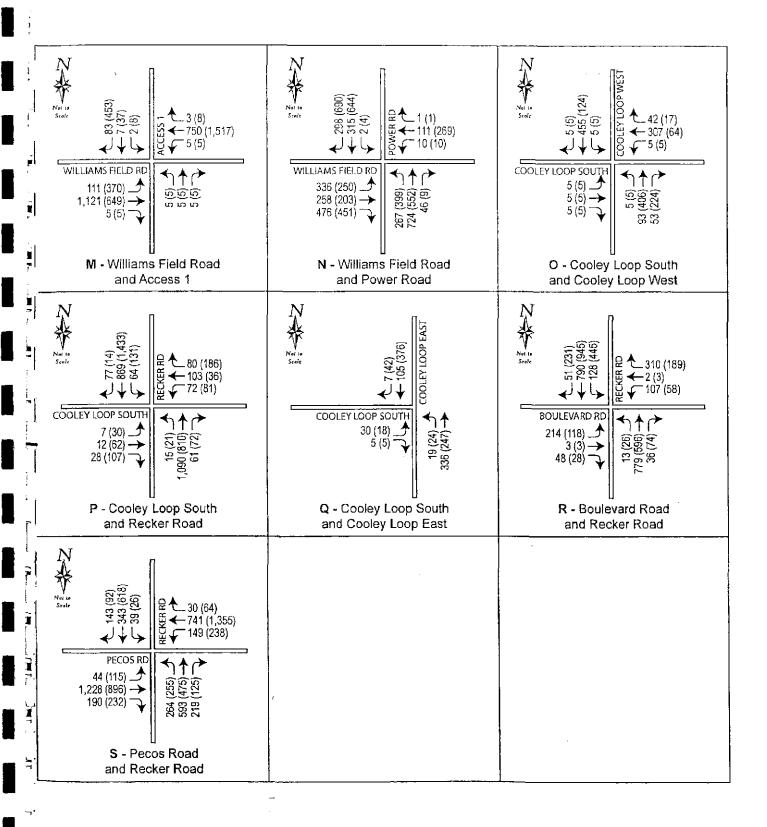
IASK

Cooley Station Troffic Impact Study

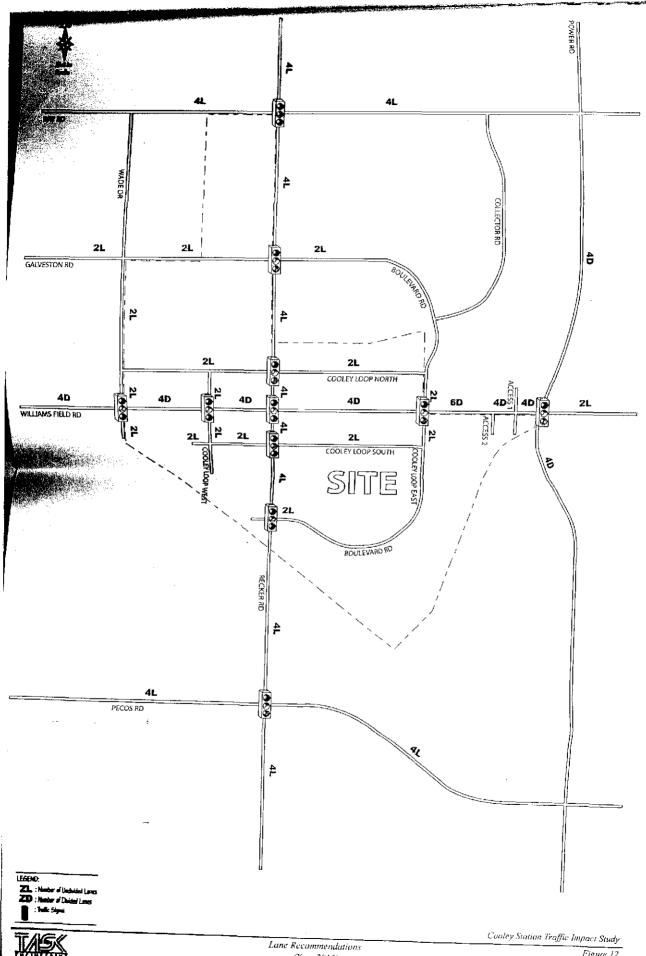




AM (PM) Peak Hour Total Traffic (Year 2025) Figure 11-1 Page 25 11/2006



С



Lane Recommendations (Year 2015)

Figure 12
Page 27

Signalized intersection analysis is based on control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The level of service (LOS) criteria for signalized intersection analysis is presented in Table 4. The signalized intersection analysis used a cycle length of 94 seconds.

Unsignalized intersections were analyzed as STOP sign controlled intersections using the unsignalized intersection portion of the HCS 2000 Software. The LOS for the "worst" turning movements is reported for unsignalized intersections. Usually, this is the left turn from the minor street or access drive. The LOS criterion for unsignalized intersections is reported in Table 5.

All unsignalized intersections were analyzed as full access intersections. STOP sign control was set on the minor street approach.

Most of the study intersections will operate at an LOS C or better under future conditions, with two exceptions.

The unsignalized intersection of Cooley Loop South and Cooley Loop West experiences an LOS E in the morning peak hour for northbound left turns. In addition, the signalized intersection of Williams Field Road and Recker Road experiences an LOS D in the evening peak hour.

The resulting levels of service are shown on Figure 13 for Year 2025 conditions. HCS worksheet summaries are included in Appendix A.

Table 4 Level of Service Criteria for Signalized Intersections

Cooley Statio	n Traffic Impact Study
Level of	Control Delay
Service	(sec./yeh.)
Α	≤ 10.0
В	> 10.0 and ≤ 20.0
С	> 20.0 and ≤35.0
D	> 35.0 and ≤ 55.0
E	> 55.0 and ≤ 80.0
F	> 80.0

Source: Exhibit 16-2, Highway Capacity Manual 2000, Transportation Research Board

Table 5
Level of Service Criteria for
Unsignalized Intersections
Cooley Station Traffic Impact Study

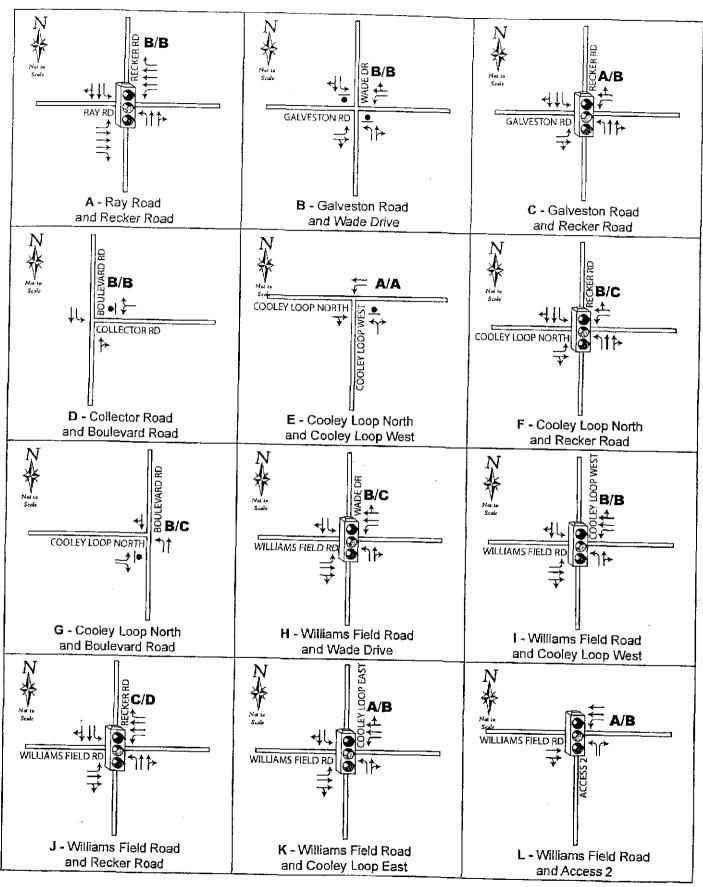
Level of Service	Control Delay (sec./veh.)
Α	≤ 10.0
В	$> 10.0 \text{ and } \le 15.0$
C	> 15.0 and ≤ 25.0
D	> 25.0 and ≤ 35.0
E	> 35.0 and ≤ 50.0
F	>50.0

Source: Exhibit 17-2, Highway
Capacity Manual 2000, Transportation
Research Board.

DESIGN ISSUES

Proposed Roundabouts

Roundabouts are proposed at several locations throughout the Cooley Station development, including several located along Boulevard Road between Cooley Loop South and Recker Road. All are on local or collector streets. If the outside radius of the circular roadway is between 100 and 110 feet, the roundabouts will provide adequate capacity, improved safety and trucks and fire trucks will be able to maneuver through them.





3

Cooley Station Traffic Impact Study

Cooley Station Traffic Impact Study



Ì

3

ď

m

E

ı

II.

Right Turn Lanes

Right turn deceleration lanes are justified at the following locations due to high volumes of right turns:

- Power Road at Williams Field Road (southbound to westbound and eastbound to southbound)
- Recker Road at Ray Road (westbound to northbound and eastbound to southbound).

These are right turn lanes at signalized intersections that will experience high peak hour turning volumes and for which the right turn lanes result in an overall reduction in delay.

SIGNAL WARRANT ANALYSIS

The Maricopa Department of Transportation (MCDOT) has adopted guidelines for determining if traffic signals are warranted on the basis of estimates of average daily traffic (ADT). These are established by Policy/Procedure Guideline 4-4.6. These guidelines extrapolate the traffic signal warrants of the Manual on Uniform Traffic Control Devices (MUTCD) to estimates of total daily volumes. The guidelines are found in Appendix H.

Year 2015

These procedures were utilized with the average daily traffic volumes for Year 2015 at the following intersections:

- Williams Field Road at Cooley Loop East
- Recker Road at Cooley Loop North
- Recker Road at Williams Field Road
- · Recker Road at Cooley Loop South
- · Recker Road at Boulevard Road
- Williams Field Road at Cooley Loop West

Signal warrants were not completed for the following intersections since signals currently exist at these intersections:

- Recker Road at Ray Road
- Recker Road at Pecos Road
- Williams Field Road at Power Road

Table 6 compares approach volumes and warranting volumes for the above referenced intersections.

Table 6
Traffic Signal Needs Using ADT Volume Warrant (Year 2015)

Cooley Station Traffic Impact Study

Intersection	Williams Field	Recker Road at	Recker Road at
	Road at Cooley	Cooley Loop	Williams Field
	Loop East	North	Road
Major Street ADT	31,585	21,810	29,290
Major Street Warranting ADT	12,000	12,000	12,000
Minor Street Approach ADT	7,340	5,480	23,270
Minor Street Warranting Volume	3,000	3,000	4,000
Meets Warrant?	Yes	Yes	Yes

Intersection	Recker Road at	Williams Field	Recker Road at
	Cooley Loop	Road at Cooley	Boulevard
	South	Loop West	Road
Major Street ADT	22,405	28,980	17,250
Major Street Warranting ADT	12,000	12,000	12,000
Minor Street Approach ADT	7,540	6,230	7,800
Minor Street Warranting Volume	3,000	3,000	3,000
Meets Warrant?	Yes	Yes	Yes

As can be seen from Table 6, the following intersections are anticipated to meet traffic signal warrants fro Year 2015 conditions:

- Williams Field Road at Cooley Loop East
- Recker Road at Cooley Loop North
- Recker Road at Williams Field Road
- Recker Road at Cooley Loop South
- Recker Road at Boulevard Road
- Williams Field Road at Cooley Loop West

Year 2025

These procedures were utilized with the average daily traffic volumes for Year 2025 at the following intersections:

- Recker Road at Galveston Road
- Williams Field Road at Wade Drive
- Williams Field Road at Access 2
- Williams Field Road at Access 1

Table 7 compares approach volumes and warranting volumes for the above referenced intersections.

Table 7
Traffic Signal Needs Using ADT Volume Warrant (Year 2025)

Cooley Station Traffic Impact Study

Intersection	Recker Road at Galveston Road	Williams Field Road at Wade Drive
Major Street ADT	24,575	29,830
Major Street Warranting ADT	12,000	12,000
Minor Street Approach ADT	8,190	3,450
Minor Street Warranting Volume	3,000	3,000
Meets Warrant?	Yes	Yes

Intersection	Williams Field Road at Access 1	Williams Field Road at Access 2
Major Street ADT	28,185	33,225
Major Street Warranting ADT	12,000	12,000
Minor Street Approach ADT	9,000	9,410
Minor Street Warranting Volume	3,000	3,000
Meets Warrant?	Yes	Yes

As can be seen from Table 7, the following intersections are anticipated to meet traffic signal warrants fro Year 2025 conditions:

- Recker Road at Galveston Road
- Williams Field Road at Wade Drive
- Williams Field Road at Access 2
- Williams Field Road at Access 1.

RECOMMENDATIONS

The proposed site is a mixed residential and commercial site that will generate an estimated 117,006 total trip ends per day, with 4,373 morning peak hour outbound trips total and 6,100 evening peak hour inbound trips total. The traffic disperses in such a way that it can be accommodated on the internal driveway and connecting arterial system with the following recommended improvements. Recommendations are shown on Figure 12 for Year 2015 and Figure 13 for Year 2025. Town of Gilbert standard cross sections are found in Appendix F.

Year 2015 Conditions:

- The following roadways are recommended to be four-lane, divided roadways for Year
 2015:
 - Williams Field Road (west of Cooley Loop East and east of Access 2)
 - Power Road

- Williams Field Road between Cooley Loop East and Access 2 is recommended to have three lanes in each direction.
- The following roadways are recommended to be four-lane roadways for Year 2015 conditions:
 - Ray Road
 - Recker Road
- The following roadways are recommended to be four-lane roadways for Year 2015 conditions:
 - Galveston Road
 - Boulevard Road
 - Wade Drive
 - Cooley Loop
 - Williams Field Road (east of Power Road).
- Locations where traffic signals are expected to be warranted by 2015 are shown on Figure 12, and include the following:
 - Williams Field Road at Cooley Loop East
 - Recker Road at Cooley Loop North
 - Recker Road at Williams Field Road
 - Recker Road at Cooley Loop South
 - · Recker Road at Boulevard Road
 - Williams Field Road at Cooley Loop West

Year 2025 Conditions:

- Right turn deceleration lanes are recommended at the following locations:
 - Power Road at Williams Field Road (southbound to westbound and eastbound to southbound)
 - Recker Road at Ray Road (westbound to northbound and eastbound to southbound).
- The internal collector streets should be designed in accordance with the Town of Gilbert design standards.
- Power Road and Ray Road are recommended to be six-lane roadways per the Town
 of Gilbert standards.
- The proposed roundabouts, including several located along Boulevard Road between Cooley Loop South and Recker Road are recommended to have an outside radius of the circular roadway between 100 and 110 feet. The roundabouts will provide

adequate capacity, improved safety and trucks and fire trucks will be able to maneuver through them.

- Additional traffic signals are recommended at the following locations for Year 2025 (recommendations are shown on Figure 13-1 and Figure 13-2):
 - Recker Road at Galveston Road
 - Williams Field Road at Wade Drive
 - Williams Field Road at Access 2
 - Williams Field Road at Access 1

APPENDIX A: CAPACITY SUMMARIES

Coneral Inform	ation				<u>HCS</u>	+" [DETAIL	ED REF				··-					
alyst	SAD							Interse			Post	ar Pd at 5	my D-				
Agency or Co.	TASK Eng								Intersection Recker Rd at Ray Road Area Type All other areas								
Sate Performed	-				1	Jurisdiction Gilbert											
ne Period								Analys			Onde	11					
ne renod								1		<i>-</i> 0,	Reck	er Road a	Ray	Road AM	A Pk		
								Project	HD		Hr-20		110)	1000 7 17			
Jume and Ti	ming input		T	EB			Τ.	11/7							1		
			LT	T⊦		Т	LT	TH TH		RT	+	NE TI		RT	LT	SB	T
Imber of Lane	s, N ₁		1	3	+ ;	<u> </u>	1	3		1	1	2	}	0	1 1	TH 2	RT
ne Group			L	7	$-\frac{1}{R}$	_	L	T	\dashv	R	+ ;	TR	\dashv		1 /		+
⇒lume, V (vph)			35	457			25	432		359	39		- 	240		TR	+
Heavy Vehicle			0	- 10.	10		0	0	\dashv	0	0	0 43	'	240	315	345	6
ak-Hour Facto			0.92	0.92	_+-	,	0.92	0.92		0.92	0.92				0	0	0
Pretimed (P) or			A	A	A	-	A A	0.52 A		0.92 A	0.92 A	0.92 A	-	0.92	0.92	0.92	0.92
Frant-up Lost Tin			2.0	2.0	2.0)	2.0	2.0	 	2.0	2.0		\dashv	Α	2.0	2.0	A
	ective Green, e		2.0	2.0	2.0		2.0	2.0	-	2.0	2.0		\dashv		2.0	2.0	
rival Type, AT			3	3	3	-	3	3	┥	3	3	3			3	3	+-
hait Extension, I			3.0	3.0	3.0		3.0	3.0	\dashv	3.0	3.0		-		3.0	3.0	+
tering/Meterin			1.000				1.000	1.00	, 	1.000	1.00				1.000		+-
nitial Unmet De			0.0	0.0	0.0		0.0	0.0	-	0.0	0.0	0.0	· ·		0.0	0.0	+
⊋ed / Bike / RTC	R Volumes		0	0	60		0	0	-	0	10.0	0.0		40	0.0	+	
ne Width			12.0	12.0	12.0		12.0	12.0	- †	12.0	12.0		\dashv	+U	12.0	12.0	0
Sarking / Grade / Parking		N	0	N		N	0	寸	N	N	0	-+	N	N N	0	1 N	
⊋arking Maneuv		_			1		 	Ť	┪		+	- `		14	 ''	 	
ses Stopping,	Ne		0	 0	0		0	0	\dashv	0	10	ō	_		0	-	
Viin. Time for Pe	destrians, Gp		-	3.2				3.2			+-	3.2			┈	3.2	<u> — —</u>
Ryasing	EW Perm	1	02		03	Ī	04		7-	VS Perm	╧╌┑	Excl. Le		T	D7)8
	G = 27.0	G=		G =		T	G =		+	= 25.0		G = 10.4		G =	-	G =	
łing	Y = 4	Y =		Y =			Y =		-	= 4		Y = 4		Y =		Y=	
ration of Anal	ysis, T = 0.25				_			Cycle Length, C = 74.4									
ne Group Cap	pacity, Control D	elay, an	d LOS	Determi	ation							0,000 20.	91.7,				
7 :				EB				₩B				NB				SB	
·			LT	TH	RT	_	LT	TH	R	₹⊤	LT	TH		RT	LT	ΤH	RT
usted Flow R	<u>, </u>		38	497	172	-	27	470	+		433	690			342	382	
a e Group Cap c Ratio, X	auty, c		314	1878	586	+	301	1878	-		655	1158			514	1212	
7 7	a a/C		12	0.26	0.29	_	.09	0.25	0.6		2.66	0.60			0.67	0.32	
al Green Rati			36	0.36	0.36		.36	0.36	0.3).53	0.34			0.53	0.34	
*form Delay, d			5.8	16.7	16.9	_		16.6	19.		6.2	20.5	\bot		21.1	18.3	
ay Calibration			000	1.000	1.000		.000	1.000	+-		.000	1.000	_ _		1.000	1.000	
1 		—⊢	11	0.11	0.11		.11	0.11	0.2	 -).24	0.18			0.24	0.11	
premental Dela			0.2	0.1	0.3	-	0.1	0,1	+	.9	2.5	0.8	丄		3.3	0.2	
nitial Queue Del	ay, u ₃		.0	0.0	0.0	-	0.0	0.0	0.1		0.0	0.0	\bot		0.0	0.0	
inor belay			6.0	16.8	17.2	-	15.7	16.7	+-		18,7	21.3			24.4	18.5	
SA Grove LOC)	1 4	5	В	В	╇	В	В	C	<u> </u>	В	_ C			С	В	
se Group LOS										20.3				21.3			
Approach Delay			16.	8		- -	19.								<u> </u>		
			16. B 19.			+	19. B X _c = 0					C ation LOS				21.3 C	

		₹KSHEET
DAL. N.		

General Informat	ากก

Project Description Recker Road at Ray Road AM Pk Hr-2025

Average Back of Queue												£
		EB			WB			NB			SB	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	<u> </u>
Lane Group	L	T	R	L	T	R	L	TR		L	TR	<u></u>
Initial Queue/Lane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	[1]
Flow Rate/Lane Group	38	497	172	27	470	390	433	690		342	382	
Satflow/Lane	864	1900	1615	830	1900	1615	1238	1810		971	1894	
Capacity/Lane Group	314	1878	586	301	1878	586	655	1158		514	1212	
Flow Ratio	0.0	0.1	0.1	0.0	0.1	0.2	0.3	0.2		0.4	0.1	
v/c Ratio	0.12	0.26	0.29	0.09	0.25	0.67	0.66	0.60		0.67	0.32	
l Factor	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000		1.000	1.000	
Arrival Type	3	3	3	3	3	3	3	3		3	3	
Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	arr.
PF Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	_
Q1	0.5	2.7	2.5	0.4	2.5	6.8	4.8	6.2		3.8	3.1	
ke	0.3	0.5	0.4	0.3	0.5	0.4	0.5	0.5		0.4	0.5	Ī
Q2	0.0	0.2	0.2	0.0	0.2	0.9	0.9	0.7		0.8	0.2	
Q Average	0.6	2.8	2.7	0.4	2.7	7.6	5.7	6.9		4.6	3.3	E 1
Percentile Back of Queue (95th	percentile)											
fe%	2.1	2.0	2.0	2.1	2.0	1.9	1.9	1.9		2.0	2.0	
Back of Queue	1.2	5.7	5.5	0.8	5.4	14.4	11.1	13.1		9.1	6.6	
Queue Storage Ratio					'							— []
Queue Spacing	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0		25.0	25.0	
Queue Storage	0	0	0	0	0	0	О	0		0	o	Ti II
Average Queue Storage Ratio												
95% Queue Storage Ratio										<u> </u>	<u></u>	<u></u>
				_								

Copyright @ 2005 University of Florida, All Rights Reserved

HCS+™ Version 5.2

Generated: 11/8/2006 4:5

 Ξ

		TWO-WAY STO	P CONTROL	SUMMAR	Υ				
neral Information			Site Info	rmation					
alyst	MG		Intersect			Galveston Ru	at Wade Driv	/e	
Agency/Co.	TASK Eng		Jurisdicti			Gilbert			
tite Performed	8/8/2006 AM PK Hr-20	135	Analysis	Year		2025			
halysis Time Period foject Description Galveston I	Road at Wade Drive								
st/West Street: Galveston Ro	ad at wade Drive i	ANN PK MI-2025	North/Sou	ith Street;	Nade Drive		- · · · · · · · · · · · · · · · · · · ·		
ersection Orientation: East-M	/est		Study Per		.25				
Uhicle Volumes and Adjus									
jor Street		Eastbound				Westboun	d		
vement	1	2	3		4	5		6	
	L	T	R		L	T		R	
Jume (veh/h)	5	68	5		5	253		5	
ak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92	
urly Flow Rate, HFR (veh/h)	5	73	5		5	274		5	
ricent Heavy Vehicles	0	_	_		0				
ledian Type				Undivide	d				
Channelized		<u> </u>	0	<u> </u>	· · · · · · · · · · · · · · · · · · ·	1		0	
hes	1	1	0		1	1		0	
nfiguration	L		TR		L	 		TR	
istream Signal		0				0			
inor Street		Northbound				Southbour	ıd		
ovement	7	8	9		10	11		12	
<u> </u>	L L	<u>T</u>	. R		<u>L</u>	T		R	
dume (veh/h) eak-Hour Factor, PHF	18 0.92	55 0.92	8 0.92		5 0.92	16		5	
urly Flow Rate, HFR (veh/h)	19	59		8		0.92		0.92 5	
rcent Heavy Vehicles	0	0	0		0	0	—	0	
ercent Grade (%)		-1							
						0			
red Approach		N .				N			
Storage T Channelized						ļ <u> </u>		D	
না Citabilielizea নাes	1	1	0			1		0	
nfiguration	1 1		TR			 			
_ 			11/1/1/1/1/1		L	<u> </u>		TR	
elay, Queue Length, and Leve		145-16-1	 -	41 141			.		
	Eastbound	Westbound		Northboun		<u> </u>	Southbound	1	
vement	1	4	7	8	9	10	11	12	
ne Configuration √veh/h)	L	L	L		TR CT	L		TR	
ւլm) (veh/h)	5 1295	5 1533	19 558		586	5	ļ	593	
Lany (veint)	0.00	0.00	0.03		0.11	508 0.01		0.04	
% queue length	0.00	0.01	0.03	 	0.17	0.07	 	0.04	
zintrol Delay (s/veh)	7.8	7.4	11.7		11.9	12.2	 	11.3	
os	A	A	B	 	B B	B	 	- 17.3 B	
proach Delay (s/veh)			 	11.9	<u> </u>	 -	11.5	<u></u>	
pproach LOS			 	В		 	В		
nyright © 2005 University of Florida, All Ri		t	<u> </u>	HCS+™ Ve				1/8/2006 4;	

Seneral Information			Site Infor	matie	on				
Analyst	IMG		Intersection		_;		Galveston Ro	at Wade D	rive
Agency/Co.	TASK Eng		Jurisdictio	n			Gilbert		
Date Performed	8/8/2006		Analysis Y	'ear			2025		
Analysis Time Period	AM PK Hr-202	5]				<u></u>		
	Road at Wade Drive A	M Pk Hr-2025							
ast/West Street: Galveston Roa			North/Sout	_					
ntersection Orientation: East-W	est		Study Peri	oa (nr	s): 0.25				===
Vehicle Volumes and Adjust	ments								
Major Street		Eastbound					Westboun	<u>a </u>	
vlovement		2	3		┨—	4	5 T		6
1, 1, 1, 1	<u>L</u>	68	F 5		┿┈	<u>L</u>	253		R 5
Volume (veh/h) Peak-Hour Factor, PHF	5 0.92	0.92	0.92			0.92	0.92		0.9
		73	5			5	274	 	5
Hourly Flow Rate, HFR (veh/h)	5 0	73			+	0			
Percent Heavy Vehicles			<u> </u>	Ho	 divided		<u> </u>	L	
Median Type	- 	., 	7 0	OII	Jiviocu		F		0
RT Channelized	1	1	0		+	1	1	 -	
Lanes			TR		+		 		TF
Configuration	<u></u>				- 		 		41
Upstream Signal	<u> </u>					···········	<u> </u>		
Minor Street	- 	Northbound 8		9		10	Southbour 11	na .	1:
Movement		T	R			L	T		F
Volume (veh/h)	18	55	8			5	16		5
Peak-Hour Factor, PHF	0.92	0.92	0.92			0.92	0,92		0.9
Hourly Flow Rate, HFR (veh/h)	19	59	8			5	17		5
Percent Heavy Vehicles	0	0	0			0	0	<u>L_</u>	0
Percent Grade (%)		0					0		
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0				 		
Lanes	1	1	0		 	1	11		- 0
Configuration	L	<u></u>	TR			L	<u> </u>		
Delay, Queue Length, and Leve							 -	m	
Approach	Eastbound	Westbound	ļ	Nort	hbound			Southboun	d T
Movement	1	4	7	<u> </u>	8	9	10	11	
Lane Configuration	L	L	L	<u> </u>		TR	L	<u> </u>	_
v (veh/h)	5	5	19		<u></u>	67	5		
C (m) (veh/h)	1295	1533	558			586	508		
v/c	0.00	0.00	0.03			0.11	0.01	<u> </u>	
95% queue length	0.01	0.01	0.11			0.38	0.03		
Control Delay (s/veh)	7.8	7.4	11.7			11.9	12.2		
LOS	A	A	В			В	В		
Approach Delay (s/veh)	-	_			11.9			11.5	
Approach LOS			1		В		1	В	
Approach Cook University of Florida, All 8	L	Ł				on 5.7	_1	Generate	

eneral Information			Site Infor	mation				
nalyst	MG		Intersection	n		Galveston R	d at Wade Dri	ve
депсу/Со.	TASK Eng		Jurisdictio	n		Gilbert		
ate Performed	8/8/2006		Analysis Y	'ear		2025		
nalysis Time Period	PM PK Hr-20							
oject Description Galveston	Road at Wade Drive .	РМ Pk Hr-2025	Ici aus a					
st/West Street: Galveston Ro- ersection Orientation: East-M	lad	<u> </u>	Study Peri		Wade Drive			
			Study Fell	ou (ms). t).25			
chicle Volumes and Adjus	tments							
≱jor Street	1	Eastbound	3			Westbour	ıd .	
vement	L	2 T	R		4 L	5 T		6 R
slume (veh/h)	5	241	5		5	115		5
eak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
urly Flow Rate, HFR (veh/h)	5	261	5		5	124		5
	0	·	 		0			
rcent Heavy Vehicles							<u> </u>	
edian Type				Undivide	ed	, <u> </u>		,
Channelized		<u> </u>	٥					0
nes	1	1	0		1	1		0
nfiguration	L		TR		L.		 	TR
stream Signal		0				0		
inor Street		Northbound				Southbou	nd	
ovement	7	8	9		10	11		12
	<u> </u>	T	R		L.	T		R
Jume (veh/h)	0.92	25 0.92	23		5	59		5
eak-Hour Factor, PHF 'urly Flow Rate, HFR (veh/h)	7	27	0.92 24		0.92 5	0.92 64		0.92 5
rcent Heavy Vehicles								
· · · · · · · · · · · · · · · · · · ·	0	0	0		0	0		0
ercent Grade (%)		0				0		
red Approach		N N				N		
Storage		0				0		
T Channelized			0			 		0
nes	1	1	0		1	1		0
nfiguration	L		TR	<u>l_</u> _	L	<u> </u>	<u> </u>	TR
elay, Queue Length, and Leve	of Service							
oroach	Eastbound	Westbound		Northboun	nd	ŀ	Southbound	
vement	1	4	7	8	9	10	11	12
ne Configuration	L	L.	L		TR	L		TR
/eh/h)	5	5	7		51	5		69
m) (veh/h)	1469	1310	473		623	496		546
5	0.00	0.00	0.01		0.08	0.01		0.13
% queue length	0.01	0.01	0.05		0.27	0.03	1	0.43
ntrol Delay (s/veh)	7.5	7.8	12.7	· · · · · · · · · · · · · · · · · · ·	11.3	12.3		12.5
os Os	A	A	В		В	В	 	В
roach Delay (s/veh)			 	11.5			12.5	
proach LOS			 	В		 	В	

					YCS+- D	ETAILE								
neral Information	on						Site Info				·			
nalyst	JL.						Intersecti		Galvestor All other a	Road/Rec	ker Rua	40		الج
gency or Co.	TASK Engineer	ing					Area Typ		Gilbert	11602				
ite Performed	11/7/2006					1	Jurisdictio		Gilbert					7
ıme Period						1	Analysis '		Galvesto	n Road at F	Recker H	Road AM		
							Project II) 	Pk Hr-20					
olume and Timin	ng Input												0.7	<u>_</u> j]]
				EB		<u> </u>	WB			NB_			SB	
			LT	тн	RT	LT	TH	RT	LT	TH	RT	LT	TH O	RT E
umber of Lanes,	N1		1	1	0	1	1	0	1	2	0		2	(کے
ane Group			L	TR		L	TR		Ţ	TR	<u> </u>	l.	TR	
′olume, V (vph)			60	37	156	5	151	46	36	977	5	12	700	
Heavy Vehicles,	, %HV		0	0	0	0	0	0	0	0	0	0	0	٠.
eak-Hour Factor,			0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Pretimed (P) or Ac			Α	A	Α	Α	Α	Α	Α	A	A	A	A	<u> </u>
tart-up Lost Time			2.0	2.0		2.0	2.0		2.0	2.0	 	2.0	2.0	<u> </u>
Extension of Effect			2.0	2.0		2.0	2.0		2.0	2.0	<u> </u>	2.0	2.0	<u> </u>
Arrival Type, AT	<u> </u>		3	3	L	3	3		4	4	<u> </u>	4	4	Les.
Init Extension, UE	=		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Filtering/Metering,			1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	Į "į
nitial Unmet Dem			0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	-
	d / Bike / RTOR Volumes		0	0	0	0	0	0	0	0	0	0	0	0
Lane Width			12.0	12.0	1	12.0	12.0		12.0	12.0		12.0	12.0	
	ле Width rking / Grade / Parking		N	0	N	N	0	N	N	0	N	N	0	\ <u>\</u>
Parking Maneuve							\top							╇
Buses Stopping, 1			0	0	-	0	0_		0	0	<u> </u>	0	0	
Min. Time for Ped			-	3.2			3.2			3.2	. <u></u>		3.2	
Phasing	EW Perm	T	02		3	04	ļ	NS Per	m	06		07		8(
-masing	G = 19.0	G=		G≈		G=		G = 33.0	G	; =](} =	G=	<u></u>
Timing	Y = 4	Y =		Y≈		Y =		Y = 4	Y	=	\	/ =	Y =	
Duration of Analy	<u> </u>	1		- 						ycle Lengt	h, C =	60.0		
Lane Group Cap		olav a	nd LOS I	Determina	tion		-							
Lane Group Cap	sacity, Cond of S	5.2,, 1		EB			WB			NB	T	17	SB	
_			LT	TH	RT	LT	TH	RT	LT.	TH	RT	LT 13	TH 798	╀
Adjusted Flow Ra	ate, v		67	214		6	219	ļ	40	1092		234	1982	╁╴
Lane Group Cap	acity, c		341	529		345	581	 	351	1988			0.40	╂╌
			0.20	0.40		0.02	0.38	 	0.11	0.55	+	0.06	0.40	╫
v/c Ratio, X									0.55	0.55		0.55		+-
v/c Ratio, X Total Green Rati	o, g/C		0.32	0.32		0.32	0.32	 			1	100	7 8	
·			0.32 14.9	0.32 16.1		0.32 14.1	15.9		6.5	8.7		6.3	7.8	
Total Green Rati	1						15.9 1.000		6.5 0.681	8.7 0.681		0.681	0.681	
Total Green Rati Uniform Delay, d Progression Fac	tor, PF		14.9	16.1		14.1	15.9 1.000 -0.11		6.5 0.681 0.11	8.7 0.681 0.15		0.681 0.11	0.681 0.11	1
Total Green Rati Uniform Delay, d Progression Fac	l ₁ tor, PF n, k		14.9 1.000	16.1 1.000		14.1 1.000	15.9 1.000		6.5 0.681 0.11 0.1	8.7 0.681 0.15 0.3		0.681 0.11 0.1	0.681 0.11 0.1	
Total Green Rati Uniform Delay, d Progression Fac Delay Calibration	l ₁ tor, PF n, k ay, d ₂		14.9 1.000 0.11	16.1 1.000 0.11		14.1 1.000 0.11	15.9 1.000 -0.11		6.5 0.681 0.11	8.7 0.681 0.15 0.3 0.0		0.681 0.11 0.1 0.0	0.681 0.11 0.1 0.0	1,
Total Green Rati Uniform Delay, d Progression Fac Delay Calibration Incremental Dela Initial Queue De	l ₁ tor, PF n, k ay, d ₂		14.9 1.000 0.11 0.3	16.1 1.000 0.11 0.5		14.1 1.000 0.11 0.0	15.9 1.000 -0.11 0.4		6.5 0.681 0.11 0.1	8.7 0.681 0.15 0.3 0.0 6.3		0.681 0.11 0.1 0.0 4.4	0.681 0.11 0.1 0.0 5.5	
Total Green Rati Uniform Delay, d Progression Fac Delay Calibration Incremental Dela Initial Queue De Control Delay	I ₁ tor, PF n, k ay, d ₂ lay, d ₃		14.9 1.000 0.11 0.3 0.0	16.1 1.000 0.11 0.5 0.0		14.1 1.000 0.11 0.0 0.0	15.9 1.000 -0.11 0.4 0.0		6.5 0.681 0.11 0.1 0.0	8.7 0.681 0.15 0.3 0.0		0.681 0.11 0.1 0.0	0.681 0.11 0.1 0.0 5.5 A	
Total Green Rati Uniform Delay, d Progression Fac Delay Calibration Incremental Delay Initial Queue De Control Delay Lane Group LOS	I ₁ tor, PF n, k ay, d ₂ alay, d ₃		14.9 1.000 0.11 0.3 0.0 15.2	16.1 1.000 0.11 0.5 0.0 16.6 B		14.1 1.000 0.11 0.0 0.0 14.1 8	15.9 1.000 :0.11 0.4 0.0 16.3		6.5 0.681 0.11 0.1 0.0 4.6 A	8.7 0.681 0.15 0.3 0.0 6.3		0.681 0.11 0.1 0.0 4.4	0.681 0.11 0.1 0.0 5.5 A 5.4	
Total Green Rati Uniform Delay, d Progression Fac Delay Calibration Incremental Delay Initial Queue De	I ₁ tor, PF n, k ay, d ₂ alay, d ₃		14.9 1.000 0.11 0.3 0.0 15.2 B	16.1 1.000 0.11 0.5 0.0 16.6 B		14.1 1.000 0.11 0.0 0.0 14.1 B	15.9 1.000 -0.11 0.4 0.0 16.3		6.5 0.681 0.11 0.1 0.0 4.6 A	8.7 0.681 0.15 0.3 0.0 6.3 A		0.681 0.11 0.1 0.0 4.4	0.681 0.11 0.1 0.0 5.5 A	1

BACK-OF-QUEUE WORKSHEET

eneral Information

, Project Description Galveston Road at Recker Road AM Pk Hr-2025

verage Back of Queue												
		EB	· · · · · · · · · · · · · · · · · · ·		WB		<u> </u>	NB			SB	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	тн	RT
ine Group	L	TR		L	TR		L	TR		L	TR	
Mitial Queue/Lane	0.0	0.0		0.0	0.0	_	0.0	0.0		0.0	0.0	
ow Rate/Lane Group	67	214		6	219		40	1092		13	798	
stflow/Lane	1076	1670		1090	1834		638	1898		425	1892	1
apacity/Lane Group	341	529		345	581		351	1988		234	1982	
ow Ratio	0.1	0.1		0.0	0.1		0.1	0.3		0.0	0.2	
c Ratio	0.20	0.40		0.02	0.38		0.11	0.55		0.06	0.40	
nat. paractor	1.000	1.000		1.000	1.000		1.000	1.000		1,000	1.000	
rival Type	3	3		3	3		4	4		4	4	
platoon Ratio	1.00	1.00		1.00	1.00		1.33	1.33		1.33	1.33	
= Factor	1.00	1.00		1.00	1.00		0.61	0.69		0.50	0.65	
দ্রা	0.8	2.8		0.1	2.8		0.2	4.3		0.1	2.6	
(i)	0.3	0.4		0.3	0.4		0.3	0.6		0.2	0.6	
2	0.1	0.2		0.0	0.2		0.0	0.7		0.0	0.4	
Average	0.9	3.0		0.1	3.1		0.2	4.9		0.1	3.0	
ercentile Back of Queue (95th	percentile)			•	· · · · · ·			<u> </u>	T	<u></u>	···	
~%	2.1	2.0		2.1	2.0		2.1	2.0		2.1	2.0	
ack of Queue	1.8	6.1		0.2	6.2		0.5	9.6		0.2	6.1	
ueue Storage Ratio												
ueue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
Tueue Storage	0	0		o	0		0	0		0	0	
/erage Queue Storage Ratio												
% Queue Storage Ratio												
4				_								

Copyright © 2005 University of Florida, All Rights Reserved

HCS+™ Version 5.2

Generated; 11/8/2006 5:01 AM

	, ,		Site Information	n		llector Rd at Bou	levard Rd	=;₁
neral Information			Intersection				ievard 110	
nlyst	MG		Jurisdiction			lbert 25		7
ency/Co.	TASK Eng		Analysis Year			20		
te Performed	8/8/2006 AM PK Hr-2025							
alysis Time Period	L Raulayord Rd AM	Pk Hr-2025		Paulaugi	rd Board			
alysis Time Period ject Description	af Boulevard Romm		North/South Stre	et: Boulevar	O NOBO			
tAMed Street: Collector Avau	,		Study Period (hr	5). 0.20				
ersection Orientation: East-West						Westbound		i
hicle Volumes and Adjustme	ms	Eastbound				5	6	
jor Street	1	2	3			T	R	
ovement	L	T	R				2	<u></u>
(a) (b)			0.92	0.9	2	0.92	0.92	_
olume (veh/h) eak-Hour Factor, PHF	0.92	0.92	0.52	3		0	2	
ourly Flow Rate, HFR (veh/h)	0	0			,			
	0							7
ercent Heavy Vehicles			U	ndivided	T		1 0	,
ledian Type		1	0					,
RT Channelized		0	٥		0	0		_
anes	0	<u> </u>	·	L	TR	LR		
Configuration		 	·			0		=
Jostream Signal						Southbound		12
Minor Street		Northbound 8	9		10	11 T		Ŕ
Movement	7	+	R		<u> </u>	50		_
	 	196	116	0.92		0.92	0	.92
Volume (veh/h)	0.92	0.92	0.92		3	54		0
Peak-Hour Factor, PHF	0	213	126		0	0		0
Hourly Flow Rate, HFR (veh/h)	0	0	0			D		
Percent Heavy Vehicles		0				N		
Percent Grade (%)		N	T			0		
Flared Approach		0						0
Storage			0		1	1		0
RT Channelized	- 	1	0			7		
Lanes			TR		<u>.</u>	1		
Configuration	1 - 6 Paration					1	Southbound	
Delay, Queue Length, and Leve	Eastbound	Westbound		Northbound		<u> </u>	11	T
Approach		4	7	8	9	10		+
Movement	11				TR	L		+
Lane Configuration		LTR	_{		339	3	54	+
		3			955	569	890	1
v (veh/h)		1636			0.35	0.01	0.06	1
C (m) (veh/h)	 	0.00	1		<u> </u>	0.02	0.19	T
v/c	 	0.01			1.62		9.3	十
95% queue length	<u> </u>	7.2	_		10.8	11.4	 	╌
Control Delay (s/veh)					В	В	A	_
LOS		A		10.8			9.4	
							A	
Approach Delay (s/veh)			В				Generated	+1/

neral Information			Site Info	mation					
nalyst	MG		Intersection	ភា		Collector Rd	at Boulevard	Rđ	
gency/Co.	TASK Eng		Jurisdictio	π		Gilbert			
te Performed	8/8/2006		Analysis Y	'ear		2025			
alysis Time Period	PM PK Hr-2					<u> </u>			
oject Description Collector Ro		I PM Pk <u>Hr-2025</u>	1						
st/West Street: Collector Road rection Orientation: East-W					Boulevard Road				
			Study Pen	od (hrs): 0	.25				
nicle Volumes and Adjust	ments			<u>.</u>		<u></u>			
jor Street		Eastbound				Westbour	ıd		
rement	11	2	3		4	5		6	
1	<u> </u>	T	R		L	Т		R	
lume (veh/h) ak-Hour Factor, PHF	0.92	0.92	0.00		12	200		2	
			0.92		0.92	0.92		0.92	
ırly Flow Rate, HFR (veh/h)	0	<u> </u>	0		13	0		2	
rcent Heavy Vehicles	0				0	_		_	
dian Type				Undivide	d			<u>-</u>	
Channelized		·	0				-	0	
nes	0	0	D	 	D	0		0	
ifiguration	- 				LTR	LR			
	 				LIIV	0			
tream Signal							!		
nor Street	7	Northbound 8	9		10	Southbou	nd	42	
vement	 	- - 6 T	R		L	11 T		12 R	
iume (veh/h)	+	84	52		3	178			
ak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92	
irly Flow Rate, HFR (veh/h)	0	91	56		3	193		0	
cent Heavy Vehicles	0	0	0		0	0		0	
rcent Grade (%)		0				0			
ed Approach		N				N N			
	- 	- N				0			
torage Channelized	+	-}	0			-		0	
res	0	1			1	1		0	
			TR			<u>'</u>			
figuration			1 17	<u>1</u>		1	<u></u>		
lay, Queue Length, and Level		<u> </u>							
roach	Eastbound	Westbound	<u> </u>	Northbound	d 		Southbound		
/ement	1	4	7	8	9	10	11	12	
ne Configuration		LTR			TR	L	T	1	
eh/h)		13	 		147	3	193	 	
		· · · · · · · · · · · · · · · · · · ·	 				-	+	
,គា) (velt/h)		1636	 		937	767	863	↓	
" <u>————————————————————————————————————</u>		0.01	<u> </u>		0.16	0.00	0.22	1	
a queue length		0.02	1		0.56	0.01	0.86	1	
introl Delay (s/veh)		7.2			9.6	9.7	10.4		
ns		A	 		A		В	+	
			 			A	· · · · · · · · · · · · · · · · · · ·		
roach Delay (s/veh)				9.6			10.4		
proach LOS	••		I.	A		В			

TWO-WAY STOP CONTROL SUMMARY Site Information General Information Cooley Loop N./Cooley Loop W. Intersection MG Analyst Gilbert Jurisdiction TASK Eng Agency/Co. Analysis Year 2025 8/8/2006 Date Performed AM PK Hr-2025 Analysis Time Period Project Description Cooley Loop North at Cooley Loop West AM Pk Hr-2025 North/South Street: Cooley Loop West East/West Street: Cooley Loop North Study Period (hrs): 0.25 Intersection Orientation: East-West Vehicle Volumes and Adjustments Westbound Eastbound Major Street 3 4 5 6 Movement L R R L 16 46 19 114 Volume (veh/h) 0.92 0.92 0.92 0.92 0.92 0.92 Peak-Hour Factor, PHF 20 17 49 123 Hourly Flow Rate, HFR (veh/h) 0 0 0 Percent Heavy Vehicles Undivided Median Type 0 RT Channelized 1 0 1 1 0 anes Ţ TR L Configuration Ö 0 Upstream Signal Southbound Northbound Minor Street 10 11 12 9 Movement R Ĺ R Ŧ 9 Volume (veh/h) 3 0.92 0.92 0.92 0.92 0.92 0.92 Peak-Hour Factor, PHF 0 9 0 Q Hourly Flow Rate, HFR (veh/h) 0 3 0 0 0 0 0 0 Percent Heavy Vehicles 0 0 Percent Grade (%) Ν Ν lared Approach ō O Storage 0 0 RT Channelized o 0 0 0 0 0 anes LR Configuration Delay, Queue Length, and Level of Service Southbound Westbound Northbound Eastbound Approach 11 1: 10 8 9 4 7 Movement LR L Lane Configuration 12 20 v (veh/h) 869 1417 C (m) (veh/h) 0.01 0.01 v/c 0.04 0.04 95% queue length 9.2 7.6 Control Delay (s/veh)

Α

Approach Delay (s/veh)

Approach LOS

Α

9.2

Α

eneral Information			Site Info	rmation				
nalyst	MG		Intersecti	on		Cooley Loop	N./Cooley Lo	op W.
gency/Co.	TASK Eng		Jurisdictio	on		Gilbert		
ate Performed	8/8/2006		Analysis	Year		2025		
nalysis Time Period	PM PK Hr-20							
oject Description Cooley Loo	North at Cooley Lo	op West PM Pk Hr-202						
st/West Street: Cooley Loop N	iorth ont	·			ooley Loop We	st		
ersection Orientation: East-W			Study Per	iod (hrs): 0.2	25			
hicle Volumes and Adjust	ments							
jor Street		Eastbound				Westbour	10	
vement	- 	2	3			<u> </u>		6
Street (h)	<u> </u>	67	R		<u></u>			R
lume (veh/h) ak-Hour Factor, PHF	0.92	0.92	0.92		2	30		0.00
					0.92	0.92		0.92
urly Flow Rate, HFR (veh/h)	0	72	14			32		
rcent Heavy Vehicles	0		<u> </u>		0			-
edian Type				Undivided	<u>'_</u>	-		
Channelized	1		0	1	<u> </u>	1		0
nes	0	1	0		1	1		0
nnfiguration			TR			T		
stream Signal	- 	0	1/			- 0		
	+							
nor Street	 7	Northbound 8	9		10	Southbou	nd I	12
Acment	7 8 L T		R		L	11 T	- - -	12 R
Jume (veh/h)	20		42			 -		N
eak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
urly Flow Rate, HFR (veh/h)	21	0	45		0	0		0
cent Heavy Vehicles	0	0	0		0	0		0
ercent Grade (%)	 	0		 		0	L	
rred Approach	 		1			T - N		
Storage	 	0	- 			1 0		
T Channelized			0					0
nes	0	0	0		0	1 0		0
nfiguration	 	LR	- 			 -		
			<u> </u>			<u></u>		
elay, Queue Length, and Leve								
proach	Eastbound	Westbound	ļ	Northbound	·		Southbound	
vement	1	4	7	8	9	10	11	12
ne Configuration		L		LR		1	1	
'/eh/h)		2		66	 	 	 	
			}		 -	 	 	
_m) (veh/h)		1523		952	 		 	
>		0.00		0.07				
% queue length		0.00		0.22				
introl Delay (siveh)		7.4	1	9.1	 	 	 	
os		ļ			 		┼─┈┈	┿
` -		A	 	A			<u></u>	
proach Delay (s/veh)				9.1				
proach LOS	_		A					

					HCS+	DETAIL	ED REP	ORT							
General Informa	ation							ormation							
Analyst	MG						Intersed		Rec	ker Ro	d/Cooley	Loop .	North		
Agency or Co.	TASK Eng						Area Ty	pe	All c	ther a	ireas				
Date Performed	8/8/2006						Jurisdic	tion	Gilb	ert					
Time Period							Analysis	s Year							
							Project	10			oad at Cod -2025	oley L	oop No	orth	
Volume and Tin	ning Input								7 31 91 .	. N 1 11	2020				
				EB			WB				NB				SB
			LT	TH	RT	LT	TH	RT	L	T	TH	R1	Г	LT	TH
Number of Lane	s, N1		1	1	0	1	1	0	. 1		2	0		1	2
Lane Group			L	TR		Ĺ	TR		Ĺ		TR			L	TR
Volume, V (vph)			64	34	40	106	36	44		5	875	5		59	856
% Heavy Vehicle	s, %HV		0	0	0	0	0	0	0	1	0	0		0	0
Peak-Hour Facto	or, PHF		0.92	0.92	0.92	0.92	0.92	0.92	0.9	2	0.92	0.92	2	0.92	0.92
Pretimed (P) or A	Actuated (A)		A	A	A	A	Α	A	A		Α	Α		Α	A
Start-up Lost Tin	ne, lı		2.0	2.0		2.0	2.0		2.0	0	2.0			2.0	2.0
Extension of Effe	ective Green, e		2.0	2.0		2.0	2.0		2.	0	2.0			2.0	2.0
Artival Type, AT			3	3		3	3		3		3			3	3
Unit Extension, U	JE		3.0	3.0		3.0	3.0		3.0)	3.0			3.0	3.0
Filtering/Metering	g, I		1.000	1.000		1.000	1.000	,	1.0	200	1.000		1	.000	1.000
Initial Unmet Der	nand, Qь		0.0	0.0		0.0	0.0		0.0	0	0.0		一	0.0	0.0
Ped / Bike / RTC	Ped / Bike / RTOR Volumes		0	0	0	0	0	0	0		0	0		0	0
Lane Width	ane Width		12.0	12.0		12.0	12.0	1	12.	.0	12.0			12.0	12.0
Parking / Grade / Parking		N	0	N	N	0	Ν	Ν	1	0	N		N	0	
Parking Maneuv	ers, Nm											T			
Buses Stopping,	Ne		0	0		0	0		_	0	0	Т		0	0
Min. Time for Pe	destrians, G _P			3.2			3.2				3.2				3.2
Phasing	EW Perm	E	cl. Left		03	0-	4	NS Per	m	E	xd. Left		0	7	08
Timing	G = 25.1	G=	3.0	G =	_			G = 32.1	32.1 G=		5.4	ı	G =		G≒
	Y = 4	Y =	0	Y ≈		Υ=		Y = 4		Y =	O		Y =		Y =
Duration of Anal				<u> </u>						Сус	le Length	, C =	73.6		
Lane Group Ca	pacity, Control D	elay, a	and LOS		ation			,					·		
		ļ.	LT I	EB	DT	17	WB	T 57	ļ. <u>.</u>		NB			17.	SB
Adjusted Flow R	ate v		70	7H 80	RT	LT 115	7H 87	RT	LT 5	+	TH	RT	╼┼	LT -	TH 932
Lane Group Cap		-	581	596		588	594	 	363	-	956 1577			355	1577
v/c Ratio, X	201.); 2	\dashv		0.13		0.20	0.15	 	0.01	-+	0.61		-	0.18	0.59
Total Green Rati	a. a/C	_	0.12	0.13		0.44	0.15	 	0.56	\rightarrow	0.44			0.18 0.58	0.44
Uniform Delay, d		-	13.9	16.7		14.2	16.8	 	15.5		0.44 15.9 ,		\rightarrow	0.55 17.7	15.8
Progression Fac	<u> </u>		1.000	1.000		1.000	1.000	 	1.000	-	1.000	_		1.000	1.000
Delay Calibration		-+	0.11	0.11		0.11	0.11	 	0.11		0.19	\vdash		0,11	0.18
Incremental Dela	·		0.1	0.1		0.77	0.11	1	0.0	-	0.7			0.2	0.6
Initial Queue De		\dashv	0.0	0.0		0.0	0.0	 	0.0		0.0	\vdash		0.0	0.0
Control Delay			14.0	16.8		14.4	16.9	 	15.5	-	16.6	\vdash	+	18.0	16.4
Lane Group LOS	<u> </u>	-	B B	B		В	В В	 	15.5 B	-+	70.0 B	-	-	B	В
Approach Delay			15.		L		5.5	<u>I </u>		16.4		L—			16.5
Approach LOS				<u> </u>			в В		16.6					В	
Intersection Dela				1				•	Intorn	B	9010				В
	tersection Delay 16.4 yright © 2005 University of Florida, All Rights Reserved						$X_c = 0.38$			Intersection LOS ™ Varsion 5.2					erated: 11/8/20

BACK-OF-QUEUE WORKSHEET General Information Project Description Recker Road at Cooley Loop North AM Pk Hr-2025 rerage Back of Queue WB EΒ NB SB RT LT ΤН RT LT TΗ LT ΤH RT LT ТН RT ne Group L TR L TR TPL TR L mitial Queue/Lane 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 w Rate/Lane Group 70 80 115 87 5 956 64 932 1332 Matflow/Lane 1747 1347 1743 642 1898 629 1899 588 363 pacity/Lane Group 581 596 594 1577 355 1577 Dow Ratio 0.1 0.0 0.0 0.1 0.1 0.0 0.3 0.3 0.12 0.13 0.20 0.15 0.01 0.18 : Ratio 0.61 0.59 actor 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 3 3 3 rival Type 3 3 3 3 3 atoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 Factor 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.8 1.1 1.4 1.2 0.0 7.9 0.6 7.6 0.4 0.4 0.4 0.4 0.3 0.5 0.3 0.5 0.1 0.1 0.1 0.1 0.0 0.8 0.1 0.8 *Average 1.2 1.5 1.3 0.0 8.7 0.7 8.4 ercentile Back of Queue (95th percentile) 2.1 2.1 2.1 2.1 2.1 1.9 2.1 1.9 ck of Queue 1.8 25 3.0 2.7 0.1 16.3 1.4 15.7 ∄ueue Storage Ratio 25.0 25.0 25.0 25.0 25.0 25.0 25.0 ieue Spacing 25.0 ueue Storage Ö 0 0 0 0 0 0 0

ovright © 2005 University of Florida, All Rights Reserved

erage Queue Storage Ratio

HCS+™ Version 5.2

Generated; 11/8/2008 5;05 AM

					HCS	+- D	ETAILE	D I	REPO	RT							
General Informa	ation							+		rmation							
Analyst	MG								tersecti —				d/ Cooley L	.oop North			
Agency or Co.	TASK Eng							1	геа Тур			ther a	areas				
Date Performed	8/8/2006							ì	risdictio		Gilb	ert					7-
Time Period								Ar	nalysis '	Year		r	and at Can	lou Loon N	lorth		
								Pr	roject IC)			oad at Coo 2025	iley Loop n	(0) [1]		
Volume and Tin	ning Input	···						-		-,"-							
				EB					WB		Ţ		NB			SB	
			LT	TH	R	Т	LT		TH	RT	ī	T	TH	RT	LT	TH	RT
Number of Lane:	s, N ₁		1	1	0	ı	1	7	1	0			2	0	1	2	
Lane Group	<u></u>		L	TR	┪		L	寸	TR		1		TR		L	TR	
Volume, V (vph)			51	104	7 2	20	50	7	23	17	1	11	928	21	118	1290	.7.
% Heavy Vehicle			0	0	10		0	十	0	0	1	,	0	0	0	0	
Peak-Hour Facto			0.92	0.92	0.5	2	0.92	十	0.92	0.92	0.5	92	0.92	0.92	0.92	0.92	0.92
Pretimed (P) or			A	A			A	-	A	A			A	Α	A	A	71
Start-up Lost Tir			2.0	2.0	- 		2.0	十	2.0		2		2.0	1	2.0	2.0	┝╌
Extension of Effe			2.0	2.0	+-		2.0	 -	2.0	1	2		2.0		2.0	2.0	
Arrival Type, AT			3	3	+		3	+	3	+			3		3	3	
Unit Extension,			3.0	3.0	╅		3.0	┪	3.0	-	3		3.0		3.0	3.0	┝╌┶
			1.000	1.000	+		1.000	┪	1.000			000	1.000	-	1.000	1.000	-
Filtering/Meterin		····	0.0	0.0	╬		0.0	\dashv	0.0		0		0.0	 	0.0	0.0	F. 1
Initial Unmet De				0.0			0.0	┥	0.0	 			0.0	0	0	0	0
	d / Bike / RTOR Volumes		0				! 	┵	12.0		+	2.0	12.0	 	12.0	12.0	ĒĒ
	ne Width		12.0	12.0			12.0	\dashv		- N	-			N	N N	0	N
Parking / Grade			N	0	_ \ ^		N	┥	0	- /9	+′	<u> </u>	0	18			 ''
Parking Maneuv			+				 	-		-	+		 		0	0	 -
Buses Stopping			0	0			0		0	<u> </u>		0	0	<u> </u>		3.2	عنسا
Min. Time for Pe			<u>.l</u>	3.2		 -	<u> </u>		3.2				3.2				
Phasing	EW Perm		cl. Left		03		04	1		NS Per			Excl. Left		07		8
Timing	G = 25.1	G≃		G =			G=			G = 32.1			= 5.4	G =		G=	
	Y = 4	Y =	0	Y =			Y =]	Y = 4			= 0	Y =		Y =	
Duration of Ana												Į Çy	cle Length	, C = 73.6	; 		<u>† 1</u>
Lane Group Ca	pacity, Control D	elay, a	nd LOS		ation		<u> </u>						NO			SB	
		-	LT	EB TH	RT	\dashv	LT	-	TH	RT	LT		NB TH	RT	LT	TH	T II
Adjusted Flow F	Pate v		55	135			54	-	43	11,1	12		1032		128	1410	
Lane Group Ca			622	632	 	-	539	_	07		334		1573		334	1577	†
v/c Ratio, X	pacing, c		0.09	0.21			0.10	⊢	07		0.04		0.66		0.38	0.89	
Total Green Ra	tio_n/C		0.44	0.34			0.44	▙	34		0.56		0.44		0.56	0.44	1
		-	12.9	17.2	 	_	14.6		5.4		24.8		16.4	<u> </u>	22.3	19.2	
Uniform Delay, Progression Fa			1.000	1.000	 		1.000	—	.000		1.00		1.000	 	1.000	1.000	
			0,11	0.11	 	-+	0.11	₩-	11	- , -	0.11		0.23		0.11	0.42	+
Defay Calibratio					 			Ļ	0.0		0.11	_	1.0	 	0.7	7.0	
Incremental De		\dashv	0.1	0.2	├	-+-	0.1				+		0.0		0.0	0.0	
Initial Queue De	eay, a ₃	-+	0.0	0.0	├—		0.0	-	1.0	 -	0.0				23.0	26.2	+
Control Delay			13.0	17.4	 	_	14.7	-	6.4	 -	24.	ø	17.4		C 23.0	C 20.2	+11
Lane Group LO			В	B	<u> </u>	-+	В		В	<u> </u>	C		В	L	+		<u> </u>
Approach Delay			16.					5.5		<u></u> -	┼		<u>.5</u>		 	25.9	
Approach LOS			В			_		B A -			 		3		 	<u>c</u>	
Intersection De		1	21.	9			X _c =	0.5	5				on LOS		<u> </u>	C	
Copyright @ 2005 Uni	veisity of Florida, All Rig	hts Rese							HCS+™	Version	5.2			Ge	nerated: 11/8/	/20 06 5:	

miect Description Recker Road at	Cooley Loop No	nth PM Pk	Hr-2025									
rage Back of Queue												
		EB		<u> </u>	WB]	NB			SB	1
e Group	LT L	TH TR	RT	LT L	TH TR	RŢ	LT L	TH TR	RT	LT	TH TR	RT
tial Queue/Lane	0.0	0.0		0.0	0.0	 	0.0	0.0	 	0.0	0.0	
v Rate/Lane Group	55	135	 	54	43		12	1032	 	128	1410	
tflow/Lane	1426	1854	 -	1234	1781	 	592	1893	 	592	1898	
acity/Lane Group	622	632	 	539	607	 	334	1573	 -	334	1577	
ow Ratio	0.0	0.1	 	0.0	0.0		0.0	0.3	 	0.2	0.4	
Ratio	0.09	0.21		0.10	0.07	 -	0.04	0.66	 	0.38	0.89	}
actor	1.000	1.000		1.000	1.000	├	1.000	1.000	 	1.000	1.000	┼
/al Type	3	3		3	3		3	3		3	3	†
atoon Ratio	1.00	1.00		1.00	1.00	 	1.00	1.00	 	1.00	1.00	
ractor	1.00	1.00	 	1.00	1.00		1.00	1.00	 	1.00	1.00	
	0.6	2.0		0.6	0.6	 	0.1	8.8		1.2	14.0	†
	0.5	0.5		0.4	0.5		0.3	0.5		0.3	0.5	
	0.0	0.1	 	0.0	0.0		0.0	1.0	<u> </u>	0.2	3.5	
, *verage	0.7	2.1		0.7	0.6		0.1	9.8		1.4	17.5	
centile Back of Queue (95th	percentile)	!	<u> </u>	<u></u>	'	<u></u>	ــــــ	J	<u> </u>	<u> </u>		
pk .	2.1	2.0	1	2.1	2.1	1	2.1	1.8	 	2.1	1.7	T
c of Queue	1.4	4.2		1.4	1.3		0.3	18.1	<u> </u>	2.9	30.2	1
peue Storage Ratio							<u> </u>				*	
ue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
ueue Storage	0	0		0	0		0	o		0	o	
age Queue Storage Ratio												
% Queue Storage Ratio]					[])

BACK-OF-QUEUE WORKSHEET

Analyst 'gency/Co. ate Performed Analysis Time Period Project Description Cooley Loop Ist/West Street: Cooley Loop Notersection Orientation: East-We /ehicle Volumes and Adjustr	MG TASK Eng 8/8/2006 AM PK Hr-202		Intersection	on		Coaley Loop I	V. at Bouleva	ard Rd	
te Performed Analysis Time Period Project Description Cooley Loop Ist/West Street: Cooley Loop Notersection Orientation: East-Wellehicle Volumes and Adjustr	TASK Eng 8/8/2006 AM PK Hr-202								
ate Performed Analysis Time Period Project Description Cooley Loop Ist/West Street: Cooley Loop Notersection Orientation: East-We /ehicle Volumes and Adjustr	AM PK Hr-202		Jurisdictio			Gilbert			
Project Description Cooley Loop Ist/West Street: Cooley Loop Notice resection Orientation: East-We Pehicle Volumes and Adjustr			Analysis \	rear		2025		712	
ist/West Street: Cooley Loop No rersection Orientation: East-We /ehicle Volumes and Adjustr						L		<u></u>	
ist/West Street: Cooley Loop No rersection Orientation: East-We rehicle Volumes and Adjustr	North at Boulevard	Rd AM Pk Hr-2025							
ehicle Volumes and Adjustr		, _ , _, _		th Street: Bo					
	est		Study Pen	od (hrs): 0.2	5				
	nents								
ajor Street		Eastbound				Westbound	<u> </u>		
ovement	1	2	3		4	5 T			
·	LL	Τ	R		L	· 		R	
/olume (veh/h)	32	0.92	35 0.92		0.92	0.92		0.92 ESV	
eak-Hour Factor, PHF	0.92					0.32		0.92	
эшгly Flow Rate, HFR (veh/h)	34	0	38		0	-			
ercent Heavy Vehicles	0		<u> </u>		0				
edian Type				Undivided					
xT Channelized			0					ے ہ	
anes	1	0	1		0	0	T	0 20	
<u> </u>			R						
onfiguration	L	0				0			
Jpstream Signal					 		<u> </u>	T.V.	
linor Street	Northbound 7 8		9		10	Southbour 11	ia .	12	
ovement		- 	R		L	 ''		RE	
/olume (veh/h)	5	100	<u> </u>			215		90	
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92		0.92		0.92	
'ourly Flow Rate, HFR (veh/h)	5	108	0		o	233		97 🙀	
ercent Heavy Vehicles	0	0	0		0	0		0	
Percent Grade (%)		0	Lus			0		-	
lared Approach			-1			N		G.	
		'		 		0			
Storage RT Channelized	 		0				- 	0	
anes	1	1	0		0	1		0 11	
	· ·	- - - - -	- 					TR	
Sonfiguration	1								
Delay, Queue Length, and Level		11/2-21/2-2-1	1	Northbound		Т	Southbound		
pproach	Eastbound	Westbound	 						
Йоvement	1	4	7	8	9	10	11	12	
Lane Configuration	L		L	T				/pr	
· (veh/h)	34		5	108				330	
C (m) (veh/h)	1636		499	809	 			845	
				0.13		 	 	0.=	
1/c	0.02		0.01		 	 	 -		
)5% queue length	0.06		0.03	0.46	<u> </u>		ļ <u>.</u>	1.87	
Control Delay (s/veh)	7.2		12.3	10.1				12	
.os	A		В	В				В	
Approach Delay (s/veh)				10.2	1		12.0		
Approach LOS	-		 	B		 -	B		

neral Information			Site Inform	nation						
	MG		Intersection	1						
alyst ency/Co.	TASK Eng		Jurisdiction				Gilbert			
te Performed	8/8/2006		Analysis Y	ear			2025			
alvsis Time Period	PM PK Hr-202									
ject Description Cooley Loop	North at Boulevard i	Rd PM Pk Hr-2025			-	-102				
t/West Street: Cooley Loop No	eth		North/South Study Perio			vara Ra				
ersection Orientation: East-We.			Staty Fenc	ou (ms).	0,23					
hicle Volumes and Adjustn	nents						Westboun			
jor Street		Eastbound				4	5 5			5
vernent	1	<u>2</u> T	3 R	 -						₹
	L 70		88							
ume (veh/h)	73 0.92	0.92	0.92			0.92	0.92		0.	92
ak-Hour Factor, PHF		0.92	95			0	0		- (,
urly Flow Rate, HFR (veh/h)	79									-
rcent Heavy Vehicles	0	<u>_i</u> _	<u> </u>			0	<u> </u>			
edian Type				Undivid	ded					
Channelized			0							0
	1	0	1			0	0			0
hes			R					1		
nfiguration	LL		}'`			-	 			
stream Signal	<u></u>				===		Southbou	nd.		
nor Street		Northbound	9			10	11	1102		12
vement	7	8 T	R			L	T		_	R
	30 L	330	 				131			53
nume (veh/h) eak-Hour Factor, PHF	0.92	0.92	0.92			0.92	0.92		0	92
arly Flow Rate, HFR (veh/h)	32	358	0			0	142		. (68
cent Heavy Vehicles	0	0	0			0	0			0
	+	0					0			
ercent Grade (%)							N			
red Approach		- ~	 				0			
itorage	 		- 0				 			0
T Channelized	_ 	1	0			0	1			0
<u> </u>	1		+ <u>*</u>							TR
nfiguration	<u> </u>	T								
alay, Queue Length, and Level		·					· · · · · · · · · · · · · · · · · · ·	Southbo	und	
roach	Eastbound	Westbound	<u> </u>	Northbo	una		 		т	42
/ement	1	4	7	8		9	10	11		12
ne Configuration	L		L	T						TR
7.	79		32	358						210
eh/h)		 	517	702			1			723
.n) (veh/h)	1636						 			0.29
	0.05		0.06	0.51						
i queue length	0.15		0.20	2.92	2					1,21
introl Delay (s/veh)	7.3		12.4	15.3	3					12.0
		 	В	С			1			В
0\$ 	A		 _			L	+	12.0)	
roach Delay (s/veh)	-		15.1							
pproach LOS			ł	C			1	В		

					HCS+"	DETAILE	D REPO	RT					
General Informati	tion						Site Info	rmation					
Analyst	MG						Intersect			ns Field Rd/We	ide Drive		
Agency or Co.	TASK Eng						Area Typ			er areas			
Date Performed	8/8/2006						Jurisdicti	on.	Gilbert				
Time Period							Analysis	Year	1.5.000	cuta . c	4.146		
							Project II	כ		ns Field Road : Hr-2025	at vvade L	inve	
Volume and Tim	ina Input						<u>'</u>						
,,,,,				EВ			WB			NB			SB
			LT	тн	RT	L.T	TH	RT	LT	TH	RT	LT	TH
Number of Lanes	, N1		f	2	0	1	2	0	1	1	0	1	1
Lane Group			L	TR		L	TR		L	TR		L	TR
Volume, V (vph)			23	1045	21	5	1279	14	91	17	5	13	5
% Heavy Vehicle:	s, %HV		٥	0	0	0	О	0	0	0	0	0	0
Peak-Hour Factor	r, PHF		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Pretimed (P) or A	ctuated (A)		Α	Α	Α	Α	Α	Α	Α	A	A	A	A
Start-up Lost Tim	e, lı		2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0
Extension of Effe	ctive Green, e		2.0	2.0	Γ_{-}	2.0	2.0		2.0	2.0	<u> </u>	2.0	2.0
Arrival Type, AT			3	3		3	3		3	3	<u> </u>	3	3
Unit Extension, U	E		3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0
Filtering/Metering	, 1		1.000	1.000		1.000	1.000		1.00	0 1.000	<u> </u>	1.000	1.000
Initial Unmet Den	rand, Qь		0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0
Ped / Bike / RTO	ed / Bike / RTOR Volumes		0	0	0	0	0	0	0	0	40	0	0
Lane Width	ane Width		12.0	12.0		12.0	12.0		12.0	12.0		12.0	12.0
Parking / Grade /	arking / Grade / Parking		N	0	N	N	0	Ν	N	0	M	N	0
Parking Maneuve	ers, Nm								_			<u> </u>	<u> </u>
Buses Stopping,	NB		0	0	T	0	0		0	0	<u> </u>	0	0
Min. Time for Per	destrians, G _P			3.2			3.2			3.2		<u></u>	3.2
Phasing	EW Perm	1	02	7)3	D4		NS Pen	m .	06		07	0
	G = 37.2	G=		G=		G=		G = 20.0		G=	G =		G =
Timing	Y = 4	Υ =		Y =		Υ=		Y = 4	_	Υ=	Y =		Y =
Duration of Analy	/sis, T = 0.25	<u></u>	-							Cycle Length	C = 65.	2	
	pacity, Control D	elay, ar	d LOS	Determina	tion								
				EB			WB	- DT		NB	DT	I I	SB TH
<u> </u>		$-\!\!\!\!+$	LT	TH	RT	LT	TH 1405	RT	LT 99	TH 18	RT	14	60
Adjusted Flow R			25	1159		5 192	2061		418	583		435	503
Lane Group Cap	аслу, с		122	2058		0.03	0.68	 	0.24	0.03	 	0.03	0.12
v/c Ratio X			.20	0.56			0.68		0.24	0.31		0.31	0.31
Total Green Rati			.57	0.57		0.57	9.8	 	16.9	15.8		15.8	16.3
Uniform Delay, o			5.8	8.9		6.1	1.000	 	1.000	1.000	 	1.000	1.000
Progression Fac			.000	1.000		1.000	0.25	 	0.11	0.11		0.11	0.11
Delay Calibratio		10	.11	0.16		0.11	0.25	 	0.11	0.0	 	0.0	0.1
Incremental Deli	<u> </u>		0.B	0.4	-	0.1		 	0.0	0.0	-	0.0	0.0
Initial Queue De	iay, d ₃		7.0	0.0		0.0	0.0	 	-	15.8	 	15.9	16.4
Control Delay		 -	7.6	9.2		6.2	10.8	 	17.2		 	В.	B
Lane Group LOS			<u> </u>	Α	Ļ <u>.</u>	A	B	1	В	B	<u> </u>	+-	16.3
Approach Delay 9.2						0.8		 	17.0			В	
Approach LOS			A			I	B		 	B		+	В
Historica Otion Dol	stersection Delay 10.5					$X_c = 0.53$			Intersection LOS				

seneral Information												
Select Description Williams Field Re	nad at Wade Dr	ive AM Pk	Hr-2025	-			·····					
rerage Back of Queue		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					·					
	EB		EB W			√B				SB		
∄. 	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
_ne Group	L	TR		L	TR		L	TR	<u> </u>	L	TR	<u></u>
tial Queue/Lane	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
w Rate/Lane Group	25	1159		5	1405		99	18		14	60	
atflow/Lane	213	1894		337	1897		1364	1900		1417	1639	
pacity/Lane Group	122	2058		192	2061		418	583		435	503	
ow Ratio	0.1	0.3		0.0	0.4		0.1	0.0		0.0	0.0	
Ratio	0.20	0.56		0.03	0.68		0.24	0.03		0.03	0.12	
Factor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	\Box
ival Type	3	3		3	3		3	3		3	3	
Nation Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
<u></u>	0.2	7.0		0.0	9.4		1.3	0.2		0.2	0.8	1
	0.2	0.6		0.2	0.6		0.3	0.4		0.3	0.4	
42	0.0	0.8		0.0	1.2		0.1	0.0		0.0	0.1	
\verage	0.3	7.7	 	0.0	10.6		1.4	0.2		0.2	0.8	
ercentile Back of Queue (95th	percentile)	<u></u> _	<u>' </u>	_ _	!		<u>. I</u>	_		<u> </u>	<u>.l</u>	
P.L.	2.1	1.9		2.1	1.8		2.1	2.1		2.1	2.1	
k of Queue	0.5	14.6		0.1	19.5		3.0	0.5		0.4	1.7	T
ueue Storage Ratio				.l		<u></u>		···	1	<u>, </u>	<u>. </u>	·
eue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	T
ueue Storage	0	0		0	0		0	0	i '-	0	D	
yrage Queue Storage Ratio					 			1			1	1

right © 2005 University of Florida, All Rights Reserved

ந்% Queue Storage Ratio

HCS+™ Version 5.2

Generated; 11/8/2006 5:11 AM

					HCS+"	DETAILE							 -	
3eneral Informa	tion						Site Info		14.010-	ns Field Rd/W	ada Dáy	<u> </u>		
Analyst	MG						Intersecti Area Typ			ns rieio riovivi er areas	aue Diiv	·C		
Agency or Co.	TASK Eng						Jurisdicti		Gilber					
Date Performed	8/8/2006								Gilbei					
Fime Period							Analysis		Willian	ns Field Road	at Wade	e Drive		m en
					_		Project 1	D		c Hr-2025				
Volume and Tim	ing Input													
			Ĭ	EB			WB			NB			SB	- -
			LT	ТН	RT	LT	TH	RT	LT	TΗ	RT	LT	TH	ŖΤ
Number of Lanes	s, Nt		1	2	0	1	2	0	1	1	0	1	1	11:
Lane Group			L	TR		L	TR		L	TR	<u>}</u>	L	TR	
Voiume, V (vph)			82	1233	82	5	1518	81	37	9	5	δ	15	آيو ا
% Heavy Vehicle	s. %HV		0	0	0	٥	0	٥	0	Ø	0	0	0	-
Peak-Hour Factor, PHF		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Pretimed (P) or A			A	A	A	A	A	A	A	Ā	A	Α	Α	AT I
Start-up Lost Tin			2.0	2.0		2.0	2.0		2.0	2.0	1	2.0	2.0	h
Extension of Effe			2.0	2.0		2.0	2.0	\neg	2.0	2.0		2.0	2.0	_
Arrival Type, AT			3	3	-	3	3		3	3	1	3	3	101 122
Unit Extension, l			3.0	3.0		3.0	3.0	1	3.0	3.0	 	3.0	3.0	\Box
Filtering/Metering			1.000	1.000	2	1,000	1.000	1	1.00		1	1.000	1.000	ĺ
Initial Unmet De			0.0	0.0		0.0	0.0	 	0.0	0.0	 	0.0	0.0	E3
Ped / Bike / RTC			0.0	0.0	- 0	0	0	0	0	0	0	0	0	0
	R volumes		12.0	12.0	- -	120	12.0	- 	12.0	12.0	1	12.0	12.0	100
Lane Width	I Dankin w		N	0	N	N N	0	 	N	0	N	N	0	Ñ
Parking / Grade			1 1	 			 	- -	- ''		 			1
Parking Maneuv			10	0		0	 0			0		0	0	H
Buses Stopping,			10	3.2		- -	3.2		╌┼╌	3.2		 	3.2	
Min. Time for Pe	_	1		3.2		1 04		NS Pe	<u></u>	06		07	1 7	08 5
Phasing	EW Perm	-	B Only	1_	03	04		G = 20.0		G =	G		G =	
Timing	G = 37.2	G≂		G≃		G=	•••			Y =	TY.		Y =	
	Y = 4	Υ =	4	Y =	····	Y =		Y = 4					1, -	n
Duration of Anal		- 								Cycle Length	1, 6 - 7	4.2		
Lane Group Ca	pacity, Control De	elay, a	and LOS I		nation	τ	WB		Т	NB			SB	
		-	LT I	EB TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	T ₁
Adjusted Flow F	Pate v		89	1429	 -:: -	5	1738	 	40	15		7	105	T
Lane Group Ca		\dashv	321	1797	 	102	1800	 	353	487	 	383	447	1_
v/c Ratio, X	pacity, c	\dashv	0.28	0.80		0.05	0.97	 	0.11	0.03		0.02	0.23	<u>r</u>
Total Green Ra	tio off:		0.62	0.50		0.50	0.50	 	0.27	0.27	 	0.27	0.27	╅
<u></u>		-	26.3	15.3		9.5	17.9	 	20.4	20.0	 	19.9	21.1	上
Uniform Delay,			1.000	1.000		1.000	1.000	 	1.000		+-	1.000	1.000	十:
Progression Fa					+	0.11	0.47	+	0.11	0.11	+	0.11	0.11	_
Delay Calibration			0.11	0.34	 	0.11	14.0	+	0.11	0.0	+-	0.0	0.3	T i
Incremental De			0.5	2.6		 	0.0	 	0.0	0.0	+	0.0	0.0	╼
Initial Queue Di	elay, d ₃		0.0	0.0	_{	0.0		 			+-	19.9	21.4	+
Control Delay			26.8	17.9	 	9.7	31.8	 	20.6		+	B	C	士
Lane Group LC			С	В		A	<u> </u>	<u> </u>	C	B	Д.—		21.3	
I Approach Dala	proach Delay 18.4			4			1.8			20.4				
									T					
Approach LOS			В				0.61			C ection LOS				——-

BACK-OF-QUEUE WORKSHEET Jeneral Information Soject Description Williams Field Road at Wade Drive PM Pk Hr-2025 Verage Back of Queue EB WB NB SB												
oject Description Williams Field Ro	oad at Wade Dr	ive PM Pk	Hr-2025					-				
(verage Back of Queue												
		EB	WB			NB			SB			
ane Group	LT	TH TR	RT	LT L	TH TR	RT	LT L	TH TR	RT	LT L	TH TR	RT
tial Queue/Lane	0.0	0.0	 	0.0	0.0	 	0.0	0.0	 	0.0	0.0	├
		<u> </u>				 -	 	 	<u> </u>	 -		├
low Rate/Lane Group	89	1429	├	5	1738	-	40	15	 	7	105	 -
atflow/Lane	516	1882		204	1885	 	1309	1805	<u> </u>	1421	1658	├
lapacity/Lane Group	321	1797		102	1800	ļ	353	487	<u> </u>	383	447	<u> </u>
ow Ratio	0.2	0.4		0.0	0,5		0.0	0.0		0.0	0.1	<u> </u>
/c Ratio	0.28	0.80	ļ <u>.</u>	0.05	0.97		0.11	0.03	<u> </u>	0.02	0.23	
Factor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
rrival Type	3	3		3	3	<u> </u>	3	3]	3	3	<u>l</u>
latoon Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
F Factor	1.00	1,00		1.00	1.00		1.00	1.00		1.00	1.00	
n	0.7	12.8		0.1	18.2		0.5	0.2		0.1	1.7	
7	0.3	0.6		0.2	0.6		0.3	0.4		0.3	0.4	
±2	0.1	2.1		0.0	6.4		0.0	0.0		0.0	0.1	\Box
Average	0.8	14.9		0.1	24.6		0.7	0.2		0.1	1.8	
ercentile Back of Queue (95th	percentile)		<u> </u>			. <u>L</u> -	<u> </u>		1			
*	2.1	1.8		2.1	1.7		2.1	2.1]	2.1	2.0	
ack of Queue	1.7	26.3		0.1	40.6	†	1.4	0.5		0.2	3.7	
ueue Storage Ratio									<u> </u>			
ueue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
veue Storage	0	0		0	0		0	0		0	0	Γ
verage Queue Storage Ratio]								
% Queue Storage Ratio										1		
	J		<u> </u>	<u> </u>								

copyright @ 2005 University of Florida, All Rights Reserved

HCS+™ Version 5.2

Generated: 11/8/2006 5:13 AM

					HUS+	DETAILE	ט זענו ט	11.1						
3eneral Informati	ion						Site Info		114 67	1.4 F2-1473 (14/			
Analyst	MG						Intersect			ld Rd/Cooley . er areas	LDOD VV	621		
Agency or Co.	TASK Eng						Area Typ							
Date Performed	8/8/2006						Jurisdicti		Gilbert					1
Time Period							Analysis	Year	LA EUG-	ns Field Road	of Cook	nv I 200		ξ
							Project 1)		is rieid Road AM Pk Hr-202		ey Loop		
Volume and Timi	ing Input			 -		 								
VOIDING GIVE TIME	ng mpat			EB			WB			NB			SB	
			LT	TH	RT	LT	TH	RT	t.T	TH	RT	LT	TH	BI
Number of Lanes,	N ₁		1	2	0	1	2	0	1	1	0	1	1	T
Lane Group			L	TR	+	L	TR		L	TR		L	TR	
			+ 6	1001	201	198	1144	2	87	4	45	8	56	
Volume, V (vph)	D/13/		10	0	0	0	0	10	10	0	0	0	0	
% Heavy Vehicles			 	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Peak-Hour Factor			0.92				A	A	A	A	A	A	A	1
Pretimed (P) or Ad			A	A	A	A	_		2.0	2.0	 ^	2.0	2.0	┿╌
Start-up Lost Time			2.0	2.0	-	2.0	2.0				+	2.0	2.0	┼
Extension of Effect	ctive Green, e		2.0	2.0		2.0	2.0		2.0	2.0	+	3	3	+
Arrival Type, AT			3 .	3		3	3		3	3	 	_{-		نيا
Unit Extension, Ui	E	_	3.0	3.0		3.0	3.0		3.0	3.0	ļ	3.0	3.0	
Filtering/Metering,	, 1		1.000	1.000		1.000	1.000		1.00		_	1.000	1.000	
Initial Unmet Dem	and, Q _b		0.0	0.0	<u> </u>	0.0	0.0		0.0	0.0	ļ	0.0	0.0	
Ped / Bike / RTOF	R Volumes		0	0	60	0	0	0	0	0	0	0	0	0
Lane Width	 		12.0	12.0		12.0	12.0		12.0	12.0	<u> </u>	12.0	12.0	
Parking / Grade /	Parking		N	0	N	N	0	N	N	0	N	N	0	N
Parking Maneuve	rs, Nm			T									<u> </u>	
Buses Stopping, I			0	0		0	0		0	0		0	0	
Min. Time for Ped			 	3.2			3.2			3.2			3.2	
Phasing	EW Perm	W	8 Only	$\overline{}$	03	04		NS Per	m	06		07		08 🗀
Thuoling	G = 37.2	G =		G≔		G =		G = 25.0		G⇒	G	=	G=	
Timing	Y = 4	Y =		Y≃	-	Y =		Y = 4		Υ =	Y	=	Y =	
Duration of Analy	<u> </u>	1	-1			11 =		– -,		i i —				
_ <u> </u>	313, 1 - 0.20					1 =						81.2		
Lane Group can	racity Control De	alay a	nd I OS I		otion	1 =	· · · · · · · · · · · · · · · · · · ·			Cycle Length		81.2	L	
	acity, Control De	elay, a	nd LOS I		rtion		WB					81.2	SB	
	oacity, Control De	elay, a	nd LOS E	Determina	ntion RT	LT	WB_TH	RT	LT	Cycle Length		81.2 LT	TH	
Adjusted Flow Ra		elay, a		Determina EB					LT 95	Cycle Length	, C = {			
	ate, v	elay, a	LT	Determina EB TH		LT	TH			NB TH	, C = {	LT	TH	
Adjusted Flow Ra	ate, v	-	LT 7 118	Determina EB TH 1241		LT 215	TH 1245		95	NB TH 53	, C = {	LT 9	TH 66	
Adjusted Flow Ra Lane Group Capa v/c Ratio, X	ate, v acity, c	-	7 118 0.06	Determina EB TH 1241 1627		LT 215 338	TH 1245 2147		95 418	NB TH 53 504	, C = {	LT 9 423	TH 66 578	
Adjusted Flow Ra Lane Group Cape v/c Ratio, X Total Green Ratio	ate, v acity, c o, g/C		118 0.06 0.46	Determina EB TH 1241 1627 0.76		LT 215 338 0.64	TH 1245 2147 0.58		95 418 0.23	NB TH 53 504 0.11	, C = {	LT 9 423 0.02	TH 66 578 0.11	
Adjusted Flow Ra Lane Group Capa v/c Ratio, X Total Green Ratio Uniform Delay, d	ate, v acity, c o, g/C		118 0.06 0.46	Determina EB TH 1241 1627 0.76		LT 215 338 0.64 0.59	TH 1245 2147 0.58 0.59		95 418 0.23 0.31	NB TH 53 504 0.11 0.31	, C = {	LT 9 423 0.02 0.31	TH 66 578 0.11 0.31	
Adjusted Flow Ra Lane Group Capa v/c Ratio, X Total Green Ratio Uniform Delay, d Progression Fact	ate, v acity, c o, g/C 1 tor, PF		LT 7 118 0.06 0.46 12.3 1.000	Determina EB TH 1241 1627 0.76 0.46 18.3 1.000		LT 215 338 0.64 0.59 27.8	TH 1245 2147 0.58 0.59 10.2		95 418 0.23 0.31 20.9	NB TH 53 504 0.11 0.31 20.1	, C = {	LT 9 423 0.02 0.31 19.6	TH 66 578 0.11 0.31 20.2	
Adjusted Flow Ra Lane Group Capa v/c Ratio, X Total Green Ratio Uniform Delay, d Progression Fact Delay Calibration	ate, v acity, c o, g/C tor, PF		LT 7 118 0.06 0.46 12.3 1.000 0.11	Determina EB TH 1241 1627 0.76 0.46 18.3 1.000 0.31		LT 215 338 0.64 0.59 27.8 1.000 0.22	TH 1245 2147 0.58 0.59 10.2 1.000		95 418 0.23 0.31 20.9 1.000	NB TH 53 504 0.11 0.31 20.1 1.000	, C = {	LT 9 423 0.02 0.31 19.6 1.000	TH 66 578 0.11 0.31 20.2 1.000	
Adjusted Flow Ra Lane Group Capa v/c Ratio, X Total Green Ratio Uniform Delay, d Progression Fact Delay Calibration incremental Dela	ate, v acity, c o, g/C tor, PF n, k		LT 7 118 0.06 0.46 12.3 1.000 0.11 0.2	Determina EB TH 1241 1627 0.76 0.46 18.3 1.000 0.31 2.2		LT 215 338 0.64 0.59 27.8 1.000 0.22 3.9	TH 1245 2147 0.58 0.59 10.2 1.000 0.17		95 418 0.23 0.31 20.9 1.000 0.11	NB TH 53 504 0.11 0.31 20.1 1.000 0.11	, C = {	LT 9 423 0.02 0.31 19.6 1.000 0.11	TH 66 578 0.11 0.31 20.2 1.000 0.11	
Adjusted Flow Ra Lane Group Capa v/c Ratio, X Total Green Ratio Uniform Delay, d Progression Fact Delay Calibration Incremental Dela Initial Queue Del	ate, v acity, c o, g/C tor, PF n, k		118 0.06 0.46 12.3 1.000 0.11 0.2	Determina EB TH 1241 1627 0.76 0.46 18.3 1.000 0.31 2.2 0.0		LT 215 338 0.64 0.59 27.8 1.000 0.22 3.9 0.0	TH 1245 2147 0.58 0.59 10.2 1.000 0.17 0.4 0.0		95 418 0.23 0.31 20.9 1.000 0.11 0.3	NB TH 53 504 0.11 0.31 20.1 1.000 0.11 0.1 0.0	, C = {	LT 9 423 0.02 0.31 19.6 1.000 0.11 0.0	TH 66 578 0.11 0.31 20.2 1.000 0.11 0.1	
Adjusted Flow Ra Lane Group Capa v/c Ratio, X Total Green Ratio Uniform Delay, d Progression Fact Delay Calibration incremental Dela Initial Queue Del Control Delay	ate, v acity, c o, g/C 1 tor, PF 1, k ay, d ₂ lay, d ₃		LT 7 118 0.06 0.46 12.3 1.000 0.11 0.2 0.0 12.5	Determina EB TH 1241 1627 0.76 0.46 18.3 1.000 0.31 2.2 0.0 20.5		LT 215 338 0.64 0.59 27.8 1.000 0.22 3.9 0.0	TH 1245 2147 0.58 0.59 10.2 1.000 0.17 0.4 0.0 10.6		95 418 0.23 0.31 20.9 1.000 0.11 0.3 0.0 21.2	NB TH 53 504 0.11 0.31 20.1 1.000 0.11 0.1 0.0 20.2	, C = {	LT 9 423 0.02 0.31 19.6 1.000 0.11 0.0	TH 66 578 0.11 0.31 20.2 1.000 0.11 0.1 0.0	
Adjusted Flow Ra Lane Group Capa v/c Ratio, X Total Green Ratio Uniform Delay, d Progression Fact Delay Calibration Incremental Dela Initial Queue Del Control Delay Lane Group LOS	ate, v acity, c o, g/C tor, PF to, k ay, d ₂ lay, d ₃		LT 7 118 0.06 0.46 12.3 1.000 0.11 0.2 0.0 12.5 B	Determina EB TH 1241 1627 0.76 0.46 18.3 1.000 0.31 2.2 0.0 20.5 C		LT 215 338 0.64 0.59 27.8 1.000 0.22 3.9 0.0 31.8	TH 1245 2147 0.58 0.59 10.2 1.000 0.17 0.4 0.0 10.6 B		95 418 0.23 0.31 20.9 1.000 0.11 0.3	NB TH 53 504 0.11 0.31 20.1 1.000 0.11 0.1 0.0 20.2 C	, C = {	LT 9 423 0.02 0.31 19.6 1.000 0.11 0.0 0.0 19.6	TH 66 578 0.11 0.31 20.2 1.000 0.11 0.0 20.2 C	
Adjusted Flow Ra Lane Group Capa v/c Ratio, X Total Green Ratio Uniform Delay, d Progression Fact Delay Calibration Incremental Dela Initial Queue Del Control Delay Lane Group LOS Approach Delay	ate, v acity, c o, g/C tor, PF to, k ay, d ₂ lay, d ₃		LT 7 118 0.06 0.46 12.3 1.000 0.11 0.2 0.0 12.5 B 20.5	Determina EB TH 1241 1627 0.76 0.46 18.3 1.000 0.31 2.2 0.0 20.5 C		LT 215 338 0.64 0.59 27.8 1.000 0.22 3.9 0.0 31.8 C	TH 1245 2147 0.58 0.59 10.2 1.000 0.17 0.4 0.0 10.6 B 3.7		95 418 0.23 0.31 20.9 1.000 0.11 0.3 0.0 21.2	NB TH 53 504 0.11 0.31 20.1 1.000 0.11 0.0 20.2 C 20.8	, C = {	LT 9 423 0.02 0.31 19.6 1.000 0.11 0.0 0.0 19.6	TH 66 578 0.11 0.31 20.2 1.000 0.11 0.0 20.2 C 20.2	
Adjusted Flow Ra Lane Group Capa v/c Ratio, X Total Green Ratio Uniform Delay, d Progression Fact Delay Calibration Incremental Dela Initial Queue Del Control Delay Lane Group LOS	ate, v acity, c o, g/C h tor, PF h, k sy, d ₂ lay, d ₃		LT 7 118 0.06 0.46 12.3 1.000 0.11 0.2 0.0 12.5 B	Determina EB TH 1241 1627 0.76 0.46 18.3 1.000 0.31 2.2 0.0 20.5 C		LT 215 338 0.64 0.59 27.8 1.000 0.22 3.9 0.0 31.8 C	TH 1245 2147 0.58 0.59 10.2 1.000 0.17 0.4 0.0 10.6 B 3.7		95 418 0.23 0.31 20.9 1.000 0.11 0.3 0.0 21.2	NB TH 53 504 0.11 0.31 20.1 1.000 0.11 0.1 0.0 20.2 C	, C = {	LT 9 423 0.02 0.31 19.6 1.000 0.11 0.0 0.0 19.6	TH 66 578 0.11 0.31 20.2 1.000 0.11 0.0 20.2 C	

_eneral Information												
roject Description Williams Field Ro	ad at Cooley L	oop West	AM Pk Hr	2025					_			
rerage Back of Queue					***							
		EB	EB		WB			ИВ		SB		
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
ne Group	L	TR		L	TR	<u> </u>	Į.	TR		L	TR	
tial Queue/Lane	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
w Rate/Lane Group	7	1241		215	1245		95	53]	9	66	
atflow/Lane	257	1865		569	1899		1357	1637		1373	1878	
pacity/Lane Group	118	1627		338	2147		418	504		423	578	
ow Ratio	0.0	0.3		0.4	0.3		0.1	0.0		0.0	0.0	
Ratio	0.06	0.76		0.64	0.58		0.23	0.11		0.02	0.11	
actor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
ival Type	3	3		3	3		3	3		3	3	
≄âtoon Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
`Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
or .	0.1	12.2		2.2	9.1		1.6	0.9		0.1	1.1	
	0.2	0.6		0.3	0.7		0.4	0.4		0.4	0.5	
	0.0	1.8		0.6	0.9		0.1	0.1	<u> </u>	0.0	0.1	
Average	0.1	14.0		2.7	10.1		1.7	0.9		0.1	1.1	
rcentile Back of Queue (95th	percentile)				. 	1		<u> </u>		•	/	
ķ	2.1	1.8		2.0	1.8	ļ	2.0	2.1		2.1	2.1	
ck of Queue	0.2	24.9		5.5	18.6		3.5	1.9		0.3	2.3	
ueua Storage Ratio		<u>. </u>										
eue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
ueue Storage	0	0		0	0		O	0		0	O	
erage Queue Storage Ratio				T						1		
% Queue Storage Ratio												

HCS+™ Version 5.2

					HCS+-	DETAILE	ED REPO	RT							_[]
General Informati	tion				7100.	DEINE		rmation							
Analyst	MG						Intersect	tion	W. Fie	ld Rd/Cooley	Loop	West			70
Agency or Co.	TASK Eng						Area Typ	oe	All oth	er areas					-
Date Performed	8/8/2006						Jurisdict	поі	Gilber	t					
Time Period	G 3 2000						Analysis	Year							<u></u>
rime Perioa							Project I			ns Field Road PM Pk Hr-202		oley L	0 0 0		_
Volume and Tim	ing Input	· · · · · · · · · · · · · · · · · · ·													110
				EB			WB			NB				SB	
			LT	TH	RT	LT	TH	RT	ĿΫ́	TH	RT	<u> </u>	LT	TH	R
Number of Lanes	. N1		1	2	0	1	2	0	1	1	0		1	1	
Lane Group	<u></u>		L	TR		Ĺ	TR		L	TR	T		L	TR	
Volume, V (vph)			24	1190	46	71	1672	14	182	24	21	8	8	8	₽=
% Heavy Vehicle	e %HV		0	0	0	0	0	0	0	0	0		0	0	
Peak-Hour Facto			0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	2	0.92	0.92	0.92
Pretimed (P) or A			A	A	A	A	A	A	A	A	A	 	A	A	/EE
			2.0	2.0	- 	2.0	2.0	+	2.0	2.0	+		2.0	2.0	
Start-up Lost Tim			2.0	2.0		2.0	2.0	 	2.0	2.0	+	-+	2.0	2.0	
Extension of Effe	chve Green, e		3	3		3	3		3	3	+-		3	3	T RE
Arrival Type, AT			+	_		3.0	3.0		3.0	3.0	+	┪	3.0	3.0	- javas
Unit Extension, U			3.0	3.0	_				1.00		╂─	-	1.000	1.000	
Filtering/Metering			1.000	1.000	' 	1.000		<u> </u>			+			0.0	12
Initial Unmet Den			0.0	0.0		0.0	0.0		0.0	0.0	+-		0.0		
Ped / Bike / RTO	R Volumes		0	0	0	0	0	Ö	0	0	40	'	0	0	0
Lane Width			12.0	12.0		12.0	12.0		12.0		-		12.0	12.0	N .
Parking / Grade /	Parking		N	0	N	N	0	N	N_	0	N		<u>N</u>	0	N
Parking Maneuve	ers, Nm										ļ			 	L 500
Buses Stopping,	Nв		0	0		0	0		0	0	<u> </u>		0	0	1
Min. Time for Pe	destrians, G _p			3.2			3.2	· · · · · · · · · · · · · · · · · · ·	<u> </u>	3.2				3.2	
Phasing	EW Perm	T w	B Only		03	0	4	NS Per	m	05		(07	0	8
	G = 37.2	G=	7.0	G=		G=		G = 25.0)	G =		G =		G =	
Timing	Y = 4	Υ=	4	Y =		Y =		Y = 4		Y ≂		Y =		Y =	
Duration of Analy	rsis. T = 0.25			_						Cycle Length	1, C =	81.2			Į.
	pacity, Control D	elav. a	nd LOS	Determin	ation										
2313 31000 007				EB			WB			NB				SB	
			LT	TH	RT	LT	TH	RT	LT	TH	RT		LT	TH.	1 12
Adjusted Flow R	ate, v		26	1343	<u> </u>	77	1832		198	219	<u> </u>		9	14	
Lane Group Cap	acity, c		93	1648		338	2145	┞	438	508	 		308	554	↓ ‹.
v/c Ratio, X			0.28	0.81		0.23	0.85	<u> </u>	0.45	0.43			0.03	0.03	<u> </u>
Total Green Rati	io, g/C		0.46	0.46		0.59	0.59		0.31	0.31			0.31	0.31	<u> </u>
Uniform Delay, o	11		13.7	19.0	1	23.3	13.6		22.6	22.4			19.6	19.6	
Progression Fac			1.000	1.000		1.000	1.000		1.000	1.000			1.000	1.000	
Delay Calibration			0.11	0.36	1	0.11	0.39		0.11	0.11	Τ		0.11	0.11	
Incremental Dela		1	1.6	3.3	 	0.3	3,6	1	0.7	0.6	\top		0.0	0.0	Te
Initial Queue De			0.0	0.0		0.0	0.0	1	0.0	0.0	1		0.0	0.0	
Control Delay	<u>-</u> -3		15.3	22.3	+	23.6	17.2	 	23.3	23.0	┼		19.7	19.6	
Lane Group LOS	<u> </u>		B	C	+	C	В	 	C	- c	 		В	В	<u>††</u>
			22.	<u> </u>	1	├	7.5		+	23.2	—		-	19.6	
Approach Delay			<u> </u>				B		+	C:			+	В	ت.

В

 $X_c = 0.72$

Copyright © 2005 University of Florida, All Rights Reserved

Approach LOS

Intersection Delay

С

19.9

HCS+™ Version 5.2

С

Intersection LOS

Generated: 11/8/2006 5:1.

В

B

eneral Information

Project Description Williams Field Road at Cooley Loop West PM Pk Hr-2025

verage Back of Queue

verage Back of Queue												
		EB			WB			NB			SB	
	LT_	ТН	RT	LT	TH	RT	LŤ	TH	RT	LT	TH	RT
ane Group	L	TR		L	TR		L	TR		Ĺ	TR	
itial Queue/Lane	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
low Rate/Lane Group	26	1343		77	1832		198	219		9	14	
atflow/Lane	204	1889		569	1897		1422	1649		1002	1798	
apacity/Lane Group	93	1648		338	2145		438	508		308	554	
ow Ratio	0.1	0.4		0.1	0.5		0.1	0.1		0.0	0.0	
'c Ratio	0.28	0.81		0.23	0.85		0.45	0.43		0.03	0.03	
actor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
rnval Type	3	.3		3	3		3	3		3	3	
riatoon Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
'F Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
<u></u>	0.4	13.8		0.7	17.9		3.6	3.9		0.1	0.2	
' '1	0.2	0.6		0.3	0.7		0.4	0.4		0.3	0.5	
-22	0.1	2.3		0.1	3.5		0.3	0.3		0.0	0.0	
[™] Average	0.4	16.1		0.8	21.4		3.9	4.3		0.2	0.2	
ercentile Back of Queue (95th	percentile)											
T1%	2.1	1.7		2.1	1.7		2.0	2.0		2.1	2.1	
ack of Queue	0.9	28.1		1.7	36.0		7.8	8.4		0.3	0.5	
rueue Storage Ratio				,							_	
ueue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
pueue Storage	0	0		0	0		0	0		0	0	
verage Queue Storage Ratio												
% Queue Storage Ratio						\		1				

onyright © 2006 University of Florida, All Rights Reserved

HCS+™ Version 5.2

Generated; 11/8/2008 5;17 AM

					HCS+	DETAIL	ED REF				· - · · · · · · · · · · · · · · · · · ·				
neral Informa	tion						- 	formation							
ılyst	MG						Interse				Field Rd at	Recker	Rd		
gency or Co.	TASK Eng						Area T				areas				
te Performed	8/8/2006						Jurisdi		Gilb	ert					-
ne Period							Analys	is Year	1150						a
							Projec	i ID			Field Road r-2025	at Reci	ker Road		
lume and Tim	ina Input								7114	1 7 1 11	-2020				iet i
	mg mpzt			EB		1	WB				NB			SB	
			LT	TН	RT	LT	TH	RT		T	TH	RT	LT	TH	RT
mber of Lanes	i, N1		1	2	0	1	2	1		1	2	0	1	2	
ne Group	<u> </u>	_	L	TR	\neg	L	Τ	R	1		TR	 	L	TR	╅
olume, V (vph)			6	959	91	106	113	1 94		78	865	191	89	817	70
Heavy Vehicle	s. %HV		0	0	0	0	0	0		,	0	0	0	0	70
ak-Hour Facto			0.92	0.92	0.92	0.92	0.92	0.92	0.9	92	0.92	0.92	0.92	0.92	0.92
retimed (P) or A			A	A	A	A	A	A	1	-	A	A	A	A	157
าส-นอ Lost Tim			2.0	2.0		2.0	2.0	2.0	2.		2.0	1	2.0	2.0	
lension of Effe	<u></u>		2.0	2.0		2.0	2.0	2.0	2.		2.0	 	2.0	2.0	+
ггival Type, AT		_	3	3		3	3	3			3	\vdash	3	3	-
it Extension, L	JE		3.0	3.0		3.0	3.0	3.0	3.		3.0	 	3.0	3.0	 -
ering/Metering		_	1.000		- 	1.00				000	1.000	+	1.000	1.000	+ =
itial Unmet Den			0.0	0.0	- -	0.0	0.0	0.0	0.		0.0	 	0.0	0.0	-
d / Bike / RTO			0	0.0	10	0.0	0	10			0	10	0	0	10
ne Width	T TOTAL S		12.0	12.0	+ "-	12.0			_	.0	12.0	1.0	12.0	12.0	Fx
arking / Grade /	Parking		N	0	- N	N	0	N.	-	<u>, , , , , , , , , , , , , , , , , , , </u>	0	N	N N	0	┼ ┈
*rking Maneuve		_	1 1	 	- '' -	- 1 ''	 -	- - ''- -	+	•	+	 	- 14	-	1 1
ses Stopping,			0	0	~ 	0	0	0		0	10		0	10	1
lin, Time for Pe			┯-	3.2		- 	3.2				3.2	<u> </u>	-	3.2	
	EW Perm	144	B Only		03	 -	04	NS Pe	<u></u>	T	Excl. Left		<u>1</u> 07		18 [
asing	G = 37.2	G =		G =		G =	U4	G = 36		+	= 5.4	G		G =	E 2!
iming	Y = 4	Y =		Y=		Y=		G = 30. Y ≈ 4	~	-	- J.4 - O	γ.		Y=	
	<u> Limina </u>			+-		1,-		11 - 4		+-					
ration of Analy		lalar a	~41 OC	Dotomin	etion.					I Cy	cle Length,	, L = 9	0.0		<u> </u>
ne Group Cap	pacity, Control E	лелау, а	no LUS	EB	1000	ī	WB		T		NB		7	SB	
*		_	LT	TH	RT	LT	TH	RT	LT	1	TH	RT	LT	ТН) in
justed Flow R	ate, v		7	1130		115	1229	91	85		1137		97	962	
ane Group Cap	acity, c		84	1478		224	1777	793	286		1425		274	1446	
/c Ratio, X			0.08	0.76		0.51	0.69	0.11	0.30		0.80		0.35	0.67	131
tal Green Rati	o, g/C	1	0.41	0.41		0.49	0.49	0.49	0.51		0.40		0.51	0.40	
niform Delay, d			16.0	22.6		34.3	17.6	12.3	27.7		23.6		31.8	21.8	ĥ
rogression Fac	tor, PF		1.000	1.000	i	1.000	1.000	1.000	1.00	0	1.000	_	1.000	1.000	
lay Calibration	ession Factor, PF Calibration, k			0.32		0:12	0.26	0.11	0.11		0.34		0.11	0.24	
icremental Dela	nental Delay, d ₂			2.4		2.0	1.2	0.1	0.6		3.3		0.8	1.2	j.
ritial Queue Del		\neg	0.0	0.0		0.0	0.0	0.0	0.0		0.0		0.0	0.0	┬ `
introl Delay			16.5	25.1		36.3	18.8	12.4	28.3	3	26.9	-	32.6	23.0	1
	3	$\neg +$	B	C		D	В	В	C	\neg	С	 	c	C	10
ane Group LOS						-	19,8		 	27.		l	+-	23.9	, , ,
				19.0											
Approach Delay			25.			-	19.0 B		+	C				C	

D.

eneral Information			<u></u>									
Project Description Williams Field Ro	oad at Recker F	Road AM P	k Hr-2025									
verage Back of Queue							<u></u>	·				<u>.</u>
	T	ΕB		1	WB		<u> </u>	NB		<u> </u>	SB	
 _	LT	TH	RT	LΤ	ΤΉ	RT	LT	TH	RT	LT	TH	RT
ine Group	L	TR		L	T	R	L	TR		L	TR	
itial Queue/Lane	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
ow Rate/Lane Group	7	1130		115	1229	91	85	1137		97	962	
atflow/Lane	204	1877		458	1900	1615	562	1850		537	1878	
apacity/Lane Group	84	1478		224	1777	793	286	1425		274	1446	
ow Ratio	0.0	0.3		0.3	0.3	0.1	0.2	0.3		0.2	0.3	
c Ratio	0.08	0.76		0.51	0.69	0.11	0.30	0.80		0.35	0.67	
Factor	1.000	1.000		1.000	1.000	1.000	1.000	1.000		1.000	1.000	
rival Type	3	3		3	3	3	3	3		3	3	
riatoon Ratio	1.00	1.00	ı	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
` Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
นา	0.1	12.7		1.5	12.4	1.2	1.1	13.1		1.2	10.3	
÷	0.2	0.6		0.3	0.7	0.6	0.3	0.6	<u> </u>	0.3	0.6	1
ų ž	0.0	1.8		0.3	1.4	0.1	0.1	2.1		0.2	1.1	
Average	0.1	14.5		1.8	13.8	1.3	1.2	15.2		1.4	11.4	
orcentile Back of Queue (95th	percentile)	<u> </u>	<u></u>	·	<u> </u>	<u>. </u>	<u></u>	·	<u> </u>	<u> </u>	1	<u></u>
-	2.1	1.8		2.0	1.8	2.1	2.1	1.8	<u> </u>	2.1	1.8	T
ck of Queue	0.3	25.6		3.7	24.6	2.7	2.5	26.7		2.9	20.7	
ueue Storage Ratio		<u> </u>					<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	<u> </u>	<u> </u>	<u></u>	<u> </u>	
eue Spacing	25.0	25.0		25.0	25.0	25.0	25.0	25.0		25.0	25.0	
ueue Storage	0	0		0	o	0	0	0		0	0	T
эгаде Queue Storage Ratio								1			1	1
% Queue Storage Ratio							1		<u> </u>	1	1	T

aminight @ 2005 University of Florida, All Rights Reserved

HCS+™ Version 5.2

Generaled: 11/8/2006 5:20 AN

HCS+- DETAILED REPORT Site Information eral Information Williams Field Rd at Recker Rd 130 Intersection اsylس All other areas Area Type TASK Eng gency or Co. Gilbert Jurisdiction 8/8/2006 5 e Performed Analysis Year .e Period Williams Field Road at Recker Road Project ID PM Pk Hr-2025 ume and Timing Input ΝB SB WB EΒ ТΗ RT TH RT LT RT LT ΤH RT LT TH 2 ٥ 1 2 1 1 O 1 2 2 1 nber of Lanes, No TR TR L R L T L L TR ுe Group 1158 376 67 791 123 124 1600 185 21 1384 111 Volume, V (vph) 0 0 0 0 0 0 0 a 0 0 0 deavy Vehicles, %HV 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92 eak-Hour Factor, PHF Α Α / 21 A A Α Α Α Α Α A A Pretimed (P) or Actuated (A) 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 art-up Lost Time, In 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 stension of Effective Green, e 3 3 3 3 3 3 3 3 3 Arrival Type, AT 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 it Extension, UE 1.000 1.000 1.000 1.000 1.000 1.000 **-**1.000 1.000 1.000 itering/Metering, I 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Initial Unmet Demand, Qu O 10 0 0 0 40 80 0 0 60 a 0 d / Bike / RTOR Volumes 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 ane Width N N 0 Ñ 0 0 Ν Ν N 0 N Ν Parking / Grade / Parking arking Maneuvers, Nm 0 0 0 0 O 0 0 0 0 uses Stopping, Na 3.2 3.2 3.2 3.2 Min. Time for Pedestrians, Gp 07 Excl. Left N5 Perm 11 04 03 WB Only EW Perm nasing G≃ G= G = 33.3G = 5.1G = G = 5.0G = $G \approx 38.6$ Y = 0Y = Timing Y = 4Y = Y = Y = 4Y = 0Cycle Length, C = 90.0 uration of Analysis, T = 0.25Cane Group Capacity, Control Delay, and LOS Determination SB NB WB EB TH RT LT RT īΤ TH TH RT LT TΗ 1321 135 322 73 950 1739 201 23 1559 diusted Flow Rate, v 1319 267 1329 1914 854 267 265 1543 84 Lane Group Capacity, c 0.99 0.51 0.72 0.38 0.27 0.75 0.91 1.01 0.27 /c Ratio, X 0.37 0.47 0.37 0.53 0.47 0.53 0.53 0.43 0.43otal Green Ratio, g/C 28.3 33.0 24.3 12.5 34.2 36.9 19.2 Ì. 25.7 16.6 Uniform Delay, d₁ 1.000 1.000 1.000 1.000 1.000 1.000 1,000 1.000 1,000 Progression Factor, PF 0.50 0.11 0.28 0.11 0.43 0.11 0.31 0.50 0.11 Selay Calibration, k 23.2 1.6 1.9 0.6 0.3 6.9 1.8 25.5 12.0 Incremental Delay, d₂ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 nitial Queue Delay, d₃ 51.4 34.6 26.3 12.8 34.7 26.1 18.4 51.2 48.9 Control Delay C D C С D C В В D Lane Group LOS 49.9 26.9 50.7 26.2 Approach Delay D C C D Approach LOS D $X_c = 0.94$ Intersection LOS 37.9 Intersection Delay Generated: 11/8/2006 5:29 A HCS+™ Version 5.2

eneral Information												
poject Description Williams Field R	oad at Recker R	Road PM P	Pk Hr-202:	5					-			-
verage Back of Queue												
}	LT	EB TH	RT	LT	WB TH	RT	 	NB TTI	<u> </u>	}	SB	
ane Group		TR	1 1		<u>τ</u>	R	LT L	TH TR	RT	LT L	TH TR	RT
itial Queue/Lane	0.0	0.0	† —	0.0	0.0	0.0	0.0	0.0	} -	0.0	0.0	
ow Rate/Lane Group	23	1559	 	201	1739	322	73	950	 -	135	1321	
atflow/Lane	197	1889	 	501	1900	1615	566	1872		566	1886	┼
pacity/Lane Group	84	1543	1	265	1914	854	267	1319	-	267	1329	
ow Ratio	0.1	0.4	 	0.4	0.5	0.2	0.1	0.3	<u> </u>	0.2	0.4	
; Ratio	0.27	1.01		0.76	0.91	0.38	0.27	0.72	-	0.51	0.99	 -
actor	1.000	1.000		1.000	1.000	1.000	1.000	1.000		1.000	1.000	
ival Type	3	3		3	3	3	3	3		3	3	
atoon Ratio	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
-	0.4	20.4		2.6	20.7	4.7	1.0	10.7		1.9	17.3	[
	0.2	0.6		0.3	0.7	0.6	0.3	0.6		0.3	0.6	
	0.1	8.4		0.9	4.8	0.4	0.1	1.3		0.3	6.6	
"verage	0.4	28.9		3.4	25.5	5.1	1.1	12.0		2.2	23.9	
centile Back of Queue (95th	percentile)	!	 _	·	<u> </u>	<u> </u>		<u> </u>	<u></u>		<u>l</u>	 _
A _	2.1	1,6		2.0	1.6	2.0	2.1	1.8		2.0	1.7	Γ
c of Queue	0.9	46.8		6.9	42.0	10.0	2.3	21.8		4.5	39.6	
ueue Storage Ratio												
Je Spacing	25.0	25,0		25.0	25.0	25.0	25.0	25.0		25.0	25.0	
eue Storage	0	0	<u> </u>	0	0	O	0	0		0	0	
age Queue Storage Ratio												
%*Queue Storage Ratio	\	}	·	1	1	1		[1

																	Fa
						HCS+	DETAIL	ED I	REPO	RT				·· ··· ·····			
General Informa	tion							Sit	te Info	rmation							
Analyst	MG								tersecti				Rd/Cooley	Loop Ea	st		1411
Agen cy o r Co.	TASK Eng								еа Тур		All	other a	2691I				
Date Performed	8/8/2006								risdicti		Gilb	ert					_
Time Period								An	naiysis	Year							
								Pro	oject II)			Field Road Pk Hr-2023		y Loop		
Volume and Tin	ning Input																enc:
			<u> </u>		EB				WB				ΝВ			SB	
			LT	-	TH	RT	LT	\perp	TH	RT	L	_T	TH	RT	LT	TH	RI
Number of Lanes	s, N1		1	\perp	2	0	1		2	0	_ 1	f	1	0	1	1	
Lane Group			L		TR		L		TR		I	-	TR		L	TR	
Volume, V (vph)			41		1088	11	61		780	34	1	56	25	180	93	35	
% Heavy Vehicle	s, %HV		0		0	0	0		0	0)	0	0	0	0	1
Peak-Hour Facto	r, PHF		0.92	0	.92	0.92	0.92		0.92	0.92	0.9	92	0.92	0.92	0.92	0.92	0.92
Pretimed (P) or A	ctuated (A)		Α		Α	А	А		Α	Α	1	1	Α	Α	A	A	1
Start-up Lost Tim	e, lı		2.0	- 12	2.0		2.0		2.0		2.	0	2.0		2.0	2.0	+
Extension of Effe	ctive Green, e		2.0		2.0		2.0		2.0		2.	0	2.0		2.0	2.0	1_
Arrival Type, AT			3		3		3	\neg	3		3	3	3	1	3	3	
Unit Extension, U	E		3.0	3	3.0		3.0		3.0	1	Э.	0	3.0	1	3.0	3.0	
Filtering/Metering	j, I		1.000) 1	.000		1.000	,	1.000	1	1.1	000	1.000		1.000	1.000	+=
Initial Unmet Den	nand, Qь		0.0	7	0.0		0.0	1	0.0		0.	0	0.0		0.0	0.0	100
Ped / Bike / RTO	R Volumes		0		0	0	0		0	0)	0	0	0	0	0
Lane Width	·		12.0	1	2.0		12.0	1	12.0	1	12	.0	12.0	-	12.0	12.0	TEN
Parking / Grade /	Parking		N	_	0	N	N		0	N	٨	i	0	N	N	0	Ň
Parking Maneuve	ers, Nm		1	十				一		1				1	1	 	+
Buses Stopping,	NB		0	_	0		0	一	0	1		0	0		0	0	1 -
Min. Time for Ped	destrians, Gp				3.2				3.2		_		3.2	· .		3.2	
Phasing	EW Perm	W	'8 Only	T	D3		1 0	4	<u>-</u>	NS Per	<u></u>	1	06		07		08
<u>-</u>	G = 35.0	G =		- 10	3 =		G =	·		G = 20.0		G=		G =		G=	08 LTB.
Fiming	Y =	Y=		\rightarrow	<u>-</u>		Y =			Y =		Y =		Y =		Y =	
Duration of Analy	sis. T = 0.25						1:		k				le Length,		n	1, -	101
	acity, Control De	elay, a	nd LOS	Deter	minati	on						10,0	ic congar,	0.00			
	•			EE				W	Æ		Γ		NB		.1	SB	
		_	LT	Ĭ		RT	LT	Τ⊦		RT	LT		TH	RT	LT	ТН	
Adjusted Flow Ra		_	<i>4</i> 5	119.	-		66	88	5		170		223		101	198	
Lane Group Cap	acity, c		286	210			312	239	97	·	302		550		281	557	<u>L.</u> .
v/c Ratio, X			0.16	0.57			0.21	0.37	7		0.56		0.41		0.36	0.36	10
Total Green Ratio			0.58	0.58			0.67	0.67			0.33		0.33		0.33	0.33	<u> </u>
Uniform Delay, d	<u>' </u>		5.7	7.8			10.9	4.4	<u>' </u>		16.4		15.4		15.1	15.1	1
Progression Fact			1.000	1.00			1.000	1.00	00		1.000	7	1.000		1.000	1.000	
Delay Calibration			0.11	0.16			0.11	0.11	1		0.16		0,11		0.11	0.11	
incremental Dela			0.3	0.4			0.3	0.	1		2.4		0.5		0.8	0.4	一回
nitial Queue Dela	ay, d ₃		0.0	0.0			0.0	0.0)		0.0		0.0		0.0	0.0	
Control Delay		[6.0	8.1			11.2	4.5	5		18.8		15.9		15.9	15.5	
Lane Group LOS			Α	А			В	Α			В	一	В	***	В	В	
Approach Delay			8.1	1			5	.0			T	17.2	!			15.7	
Approach LOS			A				,	A				В			1	В	[ii _r .
Intersection Dela	у		9.	1	·····		<i>X</i> ₀ =	0.52			Inters	ection	LOS		1	Α	— <u>F</u> u-
																	20D6 5:2

BACK-OF-QUEUE WORKSHEET General Information Poject Description Williams Field Road at Cooley Loop East AM Pk Hr-2025 erage Back of Queue ΕB WB NB SB LT TH RT TH LT RT LT ΤH RT LT TH RT TR ie Group Ł L TR L Ĺ TR TR itial Queue/Lane 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 w Rate/Lane Group 45 1195 66 885 170 101 198 223 atflow/Lane 490 1897 469 1888 906 1650 844 1670 286 2107 312 2397 pacity/Lane Group 302 281 557 550 ow Ratio 0.1 0.3 0.1 0.2 0.2 0.1 0.1 0.1 Ratio 0.16 0.57 0.21 0.37 0.56 0.41 0.36 0.36 1.000 1.000 actor 1.000 1.000 1,000 1.000 1.000 1,000 3 3 3 3 3 3 val Type 3 3 latoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.3 6.5 0.4 3.4 2.3 2.9 1.3 2.5 0.3 0.6 0.3 0.6 0.3 0.3 0.4 0.4 0.0 0.7 0.1 0.4 0.3 0.1 0.2 0.3 7.2 0.4 3.8 2.7 2,7 /erage 3.1 1.4 centile Back of Queue (95th percentile) 2.1 1.9 2.0 2.0 2.0 2.1 2.0 v of Queue 0.8 13.8 0.9 7.5 5.4 6.3 5,5 ueue Storage Ratio ue Spacing 25.0 25.0 25.0 25.0 25.0 25.0 25.Q 25.0 ueue Storage 0 0 0 0 0 0 0

wit @ 2005 University of Florida, All Rights Reserved

age Queue Storage Ratio

HCS+™ Version 5.2

Generated: 11/8/2006 5:30 AM

						HCS+*	DE	TAILE	n e	SEDO	RT.					····· · · ·	····		18
neral Informa	tion					ncar	DE	IAULE			mation	_							
	MG									ersecti		V	V. Field !	Rd/Cooley	Loop	East			<u>гал</u>
alyst Agency or Co.	TASK Eng								Аге	еа Турі	е	Þ	VII other a	areas					
te Performed	8/8/2006								յու	risdictio	วก	0	Silbert						اضيز
ne Period	G G 2500								Αn	alysis '	Year								Ealt
' le Period									Pro	oject ID	ו			Field Road		ooley	Loop		
<u> </u>							·			aject in		E	ast PM .	Pk Hr-202	5				
Jume and Tim	ing Input									10.00		_		NB				SB	111
					ЕВ	T ==	-		_	WB	Т ==				B	<u> </u>	LT	TH	- F3-F
_ _			LT		TH	RT	-	LT	_	TH	RT		LT	TH	╀				RI.
mber of Lanes	i, N1		1	_	2	0		1	4	2	0		1	1	10		1	1	
กе Group			L	7	TR .	ــــــ	_	L	-	TR		_	L	TR	┞		L	TR	
/olume, V (vph)			62		1248	58	_	150	4	1876	173		94	25	+	44	80	80	
Heavy Vehicle	s, %HV		0		0	0_		0		0	0]	0	0	10	<u></u>	0	0	
ak-Hour Facto	r, PHF		0.92	0	.92	0.92		0.92	ı	0.92	0.92		0.92	0.92	0.5	2	0.92	0.92	0.92
retimed (P) or A	(A)		Α		Α	Α_		Α		A	A		A	Α	A		Α	Α	78
art-up Lost Tin	ne, lı		2.0		2.0			2.0		2.0			2.0	2.0			2.0	2.0	
tension of Effe	ctive Green, e	-	2.0	1	2.0			2.0	T	2.0			2.0	2.0			2.0	2.0	
rrival Type, AT	·		3	1	3	1		3	1	3			3	3			3	3	1.5
ilt Extension, L	JE		3.0	3	3.0		╗	3.0	٦.	3.0			3.0	3.0	Т		3.0	3.0	Γ
tering/Metering			1.000	1	1.000	1 -	╗	1.000		1.000			1.000	1.000	1		1.000	1.000	- F
nitial Unmet Der			0.0	+7	0.0	†	┪	0.0	十	0.0			0.0	0.0	十		0.0	0.0	
id / Bike / RTC			0	+	0	0		0	+	0	0		0	0	(,	0	0	o
ne Width	A volumes		12.0	+	12.0	 		12.0	1	12.0	-		12.0	12.0	+-		12.0	12.0	[1]
<u> </u>	/ Darking		N	+	0	N		N	Ť	0	 N		N	0	+,		N	0	N
arking / Grade			+ ~		-	+		 ''	╁	<u> </u>	+ -		 -	+ -	+		1		<u> </u>
arking Maneuv			0	+	0	 		0	\dashv	0			0	1 0	╁╴		0	0	1
ises Stopping,			 "		3.2			-		3.2	- 1		-	3.2			 	3.2	
Min. Time for Pe		· 1 · · ·	<u></u>	- 1							NS P		'	06		Γ	07		8 🗀
nasing	EW Perm		/B Only	-	0	3	-1-	04	+							0 -	U1	G=	8
Fiming	G = 35.0	-	5.0		G=		-	G =			G = 20	.0	G			G≓		Y =	
	Y =	Y≖			Y =		L	Y =			Y =		Y 			<u>. </u>		1 -	Ī.
ration of Anal										<u> </u>			lc)	ycle Length	1, C =	= 60.0) -		
ine Group Ca	pacity, Control D	Pelay, a	and LOS	Dete	rminat	ion				100		_		ND				SB	
		- }	LT	E TI-		Rĩ	╀	LT	_	MB 'H	RT	╁╴	LT	NB TH	T R	T	Li	TH	1
ijusted Flow R	ata v		67	143		K1	-	163	-	27	131	——	102	184	╁		87	167	 - -
			127	209			4	277	l	381			328	552	╁╴		314	588	†
Låne Group Cap	Jacity, C			0.68				.59	0.9			- -	1.31	0.33	┪		0.28	0.28	1-0
//c Ratio, X			0.53	_			⊢		-			-	.33	0.33	╁		0.33	0.33	+
otal Green Rat			0.58	0.58			+	.67	0.6						┼─		14.7	14.7	+-
Uniform Delay,			7.5	8.7	_		-	8.6	8.1	_		-	4.9	15.0	+			1.000	┼┸
Progression Fac			1.000	1.0			-	.000	-	000			1.000	1.000	+-		1.000		+-
elay Calibratio			0.13	0.2			+	.18	0.4			-L	0.11	0.11	 		0.11	0.11	┿
ncremental Del	ay, d ₂		4.1	0.			-	3.3	-	7.8	<u> </u>	4	0.5	0.4	lacksquare		0.5	0.3	15
Initial Queue De	lay, d ₃		0.0	0.0	2		┩┈	0.0	0.	.0	L	-	0.0	0.0	$oldsymbol{\perp}$		0.0	0.0	┿-
ontrol Delay			11.6	9.	.6		L	21.9	10	6.6		\perp	15.4	15.4	1_		15.2	15.0	+-[-
cane Group LO	5		В	A			Γ	С	E	3			В	В			В	В	
Approach Delay			9.	7			Τ	17	7.0				15	5.4				15.1	
oproach LOS	 		A				T	ı	В			T	- 1	3				В	
i			14.	3			Τ	<i>X_c</i> =	0.73	3		ĺί	ntersecti	on LOS				В	<u></u>
ਸ਼ੀtersection Del	4 7		, , , ,																/2006

eneral Information												
roject Description Williams Field Ro	oad at Cooley L	oop East F	PM Pk Hr	2025								
erage Back of Queue												
1		EB		1	WB	1		NB			SB	· · · · · · · · · · · · · · · · · · ·
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
ne Group	L	TR		L.	TR		L	TR		L	TR	
itial Queue/Lane	0.0	0.0	ļ	0.0	0.0		0.0	0.0		0.0	0.0	
w Rate/Lane Group	67	1431		163	2227		102	184		87	167	
itflow/Lane	217	1885		416	1876		985	1657	<u> </u>	941	1763	
pacity/Lane Group	127	2094		277	2381		328	552		314	588	
ow Ratio	0.3	0.4		0.4	0.6		0.1	0.1		0.1	0.1	
Ratio	0.53	0.68		0.59	0.94		0.31	0.33		0.28	0.28	
actor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
ival Type	3	3		3	3		3	3		3	3	
atoon Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
ii	0.7	8.7		1.0	17.2		1.3	2.3		1.1	2.0	
·	0.2	0.6		0.3	0.6		0.3	0.4		0.3	0.4	
id	0.2	1.2		0.3	5.7		0.1	0.2		0.1	0.2	
¹-\verage	0.8	9.9		1.3	23.0		1.4	2.5		1.2	2.2	
proentile Back of Queue (95th	percentile)		. 		•			<u> </u>	<u> </u>	<u> </u>	<u> </u>	
1%	2.1	1.8		2.1	1.7		2.1	2.0		2.1	2.0	
ck of Queue	1.7	18.2		2.7	38.3		2.9	5.0		2.4	4.5	
ueue Storage Ratio												
eue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
ueue Storage	0	0		0	0		0	0		0	0	
erage Queue Storage Ratio												
		T		1	T	T	1	T			1	1

wright @ 2005 University of Florida, All Rights Reserved

p% Queue Storage Ratio

HCS+™ Version 5.2

Generated: 11/8/2006 5:30 AM

HCS+" DETAILED REPORT Site Information neral Information Intersection Williams Field Rd at Access 2 MG alyst All other areas Area Type TASK Eng Agency or Co. Jurisdiction Gilbert 8/8/2006 ite Performed Analysis Year ne Period Williams Field Road at Access 2 AM Project 1D Pk Hr-2025 olume and Timing Input NΒ SB WB EB RT TH RT LT TΗ RT LT TH LT RT LT TH EH. 1 1 1 2 0 umber of Lanes, Nt 2 T L R TR 1 ine Group 31 803 78 12 108 1220 Volume, V (vph) 0 0 0 0 o 0 Heavy Vehicles, %HV 0.92 0.92 0.92 0.92 0.92 0.92 eak-Hour Factor, PHF A Α Α A 7 А Α Pretimed (P) or Actuated (A) 2.0 2.0 2.0 2.0 2.0 tart-up Lost Time, In 20 20 2.0 2.0 xtension of Effective Green, e 2.0 3 3 3 3 3 Arrival Type, AT 3.0 3.0 3.0 3.0 3.0 nit Extension, UE 1.000 1.000 1.000 1.000 1.000 iltering/Metering, I 0.0 0.0 0.0 0.0 0.0 Initial Unmet Demand, Qu 0 0 ٥ 0 0 ed / Bike / RTOR Volumes o o 0 12.0 12.0 12.0 12.0 12 12.0 ane Width N N 0 N 0 Ν N Parking / Grade / Parking N Ò arking Maneuvers, Nm 0 0 0 O 0 uses Stopping, Na 3.2 3.2 3.2 Min. Time for Pedestrians, Gp 80 06 07 03 04 NB Only EW Perm 02 hasing G = 20.0G = G= G= G = G= G= G = 35.0. Timing Y ≃ Υ = Y = **Y** = Y = Y = Y = Cycle Length, C = 55.0 T III Juration of Analysis, T = 0.25 ane Group Capacity, Control Delay, and LOS Determination WB SB EB LT TH RT LT ΤH ΙŢ ТН RΤ TH RT LT 873 85 13 1443 34 diusted Flow Rate, v 656 587 2302 138 Lane Group Capacity, c 2274 0.25 0.38 0.13 0.02 ⊮c Ratio, X 0.63 0.36 0.36 0.64 0.64 Fotal Green Ratio, g/C 0.64 11.7 11.2 4.3 4.8 Uniform Delay, d₁ 6.1 1.000 1.000 1.000 1.000 1.000 Progression Factor, PF 0.11 0.11 0.11 0.21 0.11 Jelay Calibration, k 0.0 0.1 0.9 0.1 0.6 Incremental Delay, d₂ 0.0 0.0 0.0 0.0 0.0 initial Queue Delay, d₃ 11.8 11.2 4.9 6.7 5.2 Control Delay В В Lane Group LOS Α A Α 11.7 4.9 Approach Delay 6.7 R Approach LOS Α Α Α $X_c = 0.45$ Intersection LOS 6.2 Intersection Delay Generated: 11/8/2006 5:30 A HCS+™ Version 5.2 Copyright @ 2005 University of Florida, All Rights Reserved 1

BACK-OF-QUEUE WORKSHEET ieneral Information relect Description Williams Field Road at Access 2 AM Pk Hr-2025 rage Back of Queue WB EΒ NΒ \$B LT TH RT LT TH RT LT TH RT LT TH RT 7 a Group TR Ĺ. L R Rial Queue/Lane 0.0 0.00.0 0.0 0.0 v Rate/Lane Group 1443 34 873 85 13 tflow/Lane 1877 217 1900 1805 1615 2274 2302 acity/Lane Group 138 656 587 Sw Ratio 0.4 0.2 0.2 0.0 0.0 0.63 Ratio 0.25 0.38 0.13 0.02 actor 1.000 1.000 1.000 1.000 1.000 val Type 3 3 3 3 3 1.00 1.00 1.00 1.00 atoon Ratio 1.00 Factor 1.00 1.00 1.00 1.00 1.00 7.0 0.2 3.4 0.9 0.1 0.6 0.2 0.6 0.4 0.4 1.0 0.1 0.3 0.1 0.0 8.0 ^verage 0.3 3.7 0.9 0.1 proentile Back of Queue (95th percentile) 1.9 2.1 2.0 2.1 2,1 k of Queue 15.1 0.6 7.4 1.9 0.3 ueue Storage Ratio 25.0 25.0 25.0 25.0 25.0 eue Spacing ⊟eue Storage 0 0 0 0 0 rage Queue Storage Ratio iri% Queue Storage Ratio

≈
 ≈
 Nyright © 2005 University of Florida, All Rights Reserved

HCS+™ Version 5.2

Generated: 11/8/2006 5:30 AN

					HCS+~ [ETAILE								
General Information	on						Site Info		14.62	s Field Rd at	Access 2			
Analyst	MG					ı	Intersecti		William All othe		Access 2			ī
Agency or Co.	TASK Eng						Area Typ		Gilbert	l disas				
Date Performed	8/8/2006						Jurisdiction		Gilbert					-
Time Period							Analysis		William	s Field Road	at Access	2 <i>PM</i>		۲.
							Project II) — . — :	Pk Hr-2					
Volume and Timir	ng Input													
				EΒ			WB		 	NB	l	1	SB	
			LT	TH	RT.	LT	TH	RT	LT	TH	RT	LT	TH	
Number of Lanes,	N1			2	0	1	2		1_1_		1	ļ		<u> </u>
Lane Group			1	TR		L	T		<u> </u>		R			
Volume, V (vph)				1143	329	100	1870		428		76	ļ		
% Heavy Vehicles	, %HV			0	0	0	0		0		0	<u> </u>		
Peak-Hour Factor,				0.92	0.92	0.92	0.92	_	0.92		0.92	<u> </u>	1	_
Pretimed (P) or Ad]	А	Α	Α	A		A		A	 	 	
Start-up Lost Time				2.0		2.0	2.0		2.0		2.0	 		<u> </u>
Extension of Effect				2.0		2.0	2.0		2.0		2.0	<u> </u>	ļ	
Arrival Type, AT			 	3		3	3		3		3	<u> </u>	 	
Unit Extension, U				3.0		3.0	3.0		3.0		3.0		 	
Filtering/Metering			1 -	1.000		1.000	1.000		1.00	0	1.000	 	 	<u> </u>
Initial Unmet Dem				0.0	1	0.0	0.0		0.0		0.0	 		
Ped / Bike / RTOF			0	0	0	0	0	<u> </u>	0	0	0	—	_	1-
Lane Width			†	12.0	1	12.0	12.0		12.0		12.0	<u> </u>	<u> </u>	1
Parking / Grade /	Parking		N	0	N	N	0	N	N	0	N	 	-{ -	<u> </u>
Parking Maneuve													 	┷
Buses Stopping.				0		0	0		0		0		ᆚ	<u> </u>
Min. Time for Peo				3.2			3.2			3,2	····	<u></u>		
Phasing	EW Perm	<u> </u>	02	<u> </u>	03	04	4	NB On	ly	06		07		08
Tilasing	G = 35.0	G=		G=		G =		G = 20.0)	G =	G =		G=	۲
Timing	Y =	Y =		Υ=		Υ=		Y =		Υ =	Y =		Y =	
Duration of Analy				1						Cycle Lengt	h, C = 55	.0		
Lane Group Cap	acity. Control D	elav. a	nd LOS	Determina	ation								00	
Earle Group sur	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Ī		EB ·			WB	1 ==	<u> </u>	NB NB	RT	LT	SB	
			LŤ	ТН	RT	LT	TH	RT	LT	TH	83	- - ' -	- 	┽
Adjusted Flow R	ate, v			1600		109	2033	 	465		587	+		╁╌
Lane Group Cap	acity, c		<u> </u>	2225		138	2302	 	656		0.14			
v/c Ratio, X				0.72		0.79	0.88	├	0.71		0.36	+		╅╴
Total Green Rat	io, g/C			0.64		0.64	0.64	<u> </u>	0.36		11.7	+	 -	1=
Uniform Delay, o	11			6.7	<u> </u>	7.3	8.3	 	15.0		1.000	+	_	- ├:
Progression Fac	tor, PF			1.000		1.000	1.000	ļ	1.000					╌┼╌
Delay Calibratio	n, k			0.28	<u> </u>	0.34	0.41	 	0.27		0.11		- 	
Incremental Del	ay, d ₂			1.2	<u> </u>	25.9	4.5	1	3.5		0.1	-		
Initial Queue De	alay, d ₃			0.0	<u> </u>	0.0	0.0	 	0.0		0.0			
Control Delay				7.9		33.2	12.8	 	18.5		11.9		_{	-+ -
Lane Group LO	S			Α	<u> </u>	С	В	_1	В		В			<u> </u>
Approach Delay			7.	9		1	13.8		 	17.5				
Approach LOS				1			В			В				_ ;
Intersection Del	lay!		12	1.1		X.=	= 0.82		Inters	ection LOS			Benerated: 11/	

Seneral Information									<u> </u>			
oject Description Williams Field Ro	oad at Access 2	PM Pk Hr	-2025									
verage Back of Queue				· · · ·								
1	LT	EB TH	RI	LT	WB TH	Грт	 	NB	I 5±		SB	1 ==
ane Group		TR	KI .	L	T T	RT	LT L	TH	RT	LT_	TH	RT
tial Queue/Lane		0.0	 	0.0	0.0	<u> </u>	0.0		0.0	_	 	┼─
low Rate/Lane Group		1600		109	2033		465	_ _	83		 	†—
tfiow/Lane		1836		217	1900		1805		1615	<u> </u>		\vdash
apacity/Lane Group		2225		138	2302	 	656	<u> </u>	587	_	†	
ow Ratio		0.5		0.5	0.6		0.3		0.1		 	1
c Ratio		0.72		0.79	0.88	<u> </u>	0.71		0.14		 	†
actor		1.000		1.000	1.000		1.000		1.000			1
rrival Type		3		3	3		3		3		 	1
atoon Ratio		1.00		1.00	1.00		1.00		1.00			十一
F Factor		1.00		1.00	1.00	ļ	1.00		1.00			
		<i>8</i> .6		1.2	13.5		6.1		0.9			
1		0.6		0.2	0.6	<u> </u>	0.4		0.4			
Σ ₂		1.4	<u> </u>	0.5	3.6		0.9		0.1			十
Average		10.0		1.7	17.1		7.0		0.9			\top
ercentile Back of Queue (95th	percentile)			 -				1		<u> </u>	<u> </u>	<u> </u>
,		1.8		2.0	1.7	}	1.9	,	2.1]		T
ack of Queue		18.4		3.5	29.6		13.4		1.9			\top
ueue Storage Ratio												
ueue Spacing		25.0		25.0	25.0		25.0		25.0			
ueue Storage		0		0	0		0		0			
rerage Queue Storage Ratio												
% Queue Storage Ratio												

					HCS+- [ETAILE								
General Informa	ation						Site Info			Et al Dal at	44			— <u>—</u> ——1-
Analyst	MG					,	Intersect			ns Field Rd at .	Access I			il i
Agency or Co.	TASK Eng						Area Typ			er areas				
Date Performed	8/8/2006						Jurisdict		Gilbert					113
Time Period						i	Analysis	Year	1466	s Field Road	nf Annana	1 181		* ≤11
							Project I	D	Pk Hr		ai Acress	1 AM		
Volume and Tin	ning locut													rīi
Volume and Tim	ining input			EB	_		WB			NB			SB	
			LT	ТН	RT	LT	TH	RT	LT	TH	RT	LŦ	TH	ŖŢ
Number of Lane	e Ni		1	2	0	1	2	0	1	1	0	1	. 1	
Lane Group	3,111		- <u>-</u>	TR	+	L	TR		L	TR		L	TR	
			111	1121	5	5	750	3	5	5	5	2	3	22
Volume, V (vph)			0	0	10	0	0	l o	10	0	0	0	0	
% Heavy Vehicle				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	Q.92	0.92
					0.92 A	A A	0.52 A	A A	A A	A	A	A	A	ĒΠ
				A	1-	2.0	2.0	+~	2.0	2.0		2.0	2.0	
Start-up Lost Tir				2.0	 		2.0	- 	2.0	2.0	-	2.0	2.0	\vdash
				2.0	 	2.0				3		3	3	
Arrival Type, AT				3	 	3	3		3	3.0	 	3.0	3.0	
Unit Extension,			└	3.0		3.0	3.0		3.0			1.000	1.000	
Filtering/Meterin			1.000	1.000	——	1.000	1.000	<u></u>	1.00		<u> </u>		0.0	- E :
			0.0	0.0		0.0	0.0		0.0	0.0	 	0.0	0.0	├ ──
Ped / Bike / RT0	OR Volumes		0	0	0	0	0	0	0		0	0	 	0
Lane Width	· · · · · · · · · · · · · · · · · · ·		12.0	12.0	<u> </u>	12.0	12.0		12.0			12.0	12.0	r j
Parking / Grade	/ Parking		N	0	N	N	0	N	_ N	0	N _	N	0	N
Parking Maneuv	vers, N _m										 		<u> </u>	
Buses Stopping	, Na		0	0		0	0		0		<u> </u>	0	0	لنفا
Min. Time for Po	edestrians, G _P		}	3.2			3.2			3.2			3.2	
Phasing	EW Perm	EB	Only	(3	04	4	NS Pe	m	06		07		.7_8
	G = 25.0	G = 1	10.0	G=		G =		G = 20.0)	G=	G≓		G =	- K
Timing	Sur Factor, PHF 0.92			Y =		Y =		Y≖		Ϋ́	Y =		Y =	
Duration of Ana	llysis, T = 0.25									Cycle Length	, C = 55.0)		1 = =
		elay, ar	nd LOS D	etermina	tion									
				ΕB			WB			NB		 	SB	<u> </u>
				TH	RT	LT	TH	RT	LT_	TH	RT	LT	TH	-
Adjusted Flow I	Rate, v		121	1223		5	818		5	10		2	93	┨—
Lane Group Ca	ipacity, c		513	1643		138	1644	<u> </u>	436	639	 	514	591	+
v/c Ratio, X		0	.24	0.74		0.04	0.50	1	0.01	0.02	 	0.00	0.16	 -
Total Green Ra	ntio, g/C	0	0.64	0.45]	0.45	0.45	<u> </u>	0.36	0.36		0.36	0.36	
Uniform Delay,	d ₁		9.7	12.4		8.3	10.6	 	11.2	11.2	_	11.2	11.8	-
Progression Fa	ctor, PF		1.000	1.000		1.000	1.000		1.000		 	1.000	1.000	1-
Delay Calibrati	on, k	0	2.11	0.30		0.11	0.11		0.11	0.11		0.11	0.11	
Incremental De			0.2	1.9		0.1	0.2		0.0	0.0		0.0	0.1	_
		$\neg \uparrow$	0.0	0.0		0.0	0.0		0.0	0.0	<u> </u>	0.0	0.0	
Control Delay	<u>-</u>		9.9	14.3		8.4	10.8		11.2	11.2		11.2	11.9	
Lane Group LC	os	_	A	В		A	В	1	В	В		В	В	1:
Approach Dela	d (P) or Actuated (A) Lost Time, It on of Effective Green, e Type, AT ension, UE //Metering, I namet Demand, Qb ke / RTOR Volumes fidth / Grade / Parking Maneuvers, Nm Stopping, NB ne for Pedestrians, Gp G = 25.0 G Y = Y n of Analysis, T = 0.25 Froup Capacity, Control Delay ad Flow Rate, v froup Capacity, c io, X Green Ratio, g/C n Delay, d1 ssion Factor, PF Calibration, k lental Delay, d2 Queue Delay, d3 ii Delay Group LOS ach Delay Group LOS ach Delay			,		1	0.8			11.2			11.9	
Approach LOS		o	13.8 B		<u> </u>	1	В			В			В	
Intersection De		-+	12.7	7		X_=	0.40		Inters	ection LOS		1	В	
	niversity of Florida, All Rig					٠		HOSEN	Version 5	2		Ge	nerated; 11/8	V2005

eneral Information												
roject Description Williams Field R	oad at Access 1	AM Pk H	r-2025						_			
verage Back of Queue							_					
1	\	EB	RT	L.T	WB TH	RT	 	NB	1 DT	1 1 -	SB	5 67
ane Group	LT L	TH TR	17.1	L.	TR	K	LT L	TH TR	RT	LT	TH TR	RT
itial Queue/Lane	0.0	0.0	 	0.0	0.0		0.0	0.0		0.0	0.0	 -
ow Rate/Lane Group	121	1223	 	5	818	 	5	10		2	93	
atflow/Lane	806	1898	 	304	1899	 	1198	1758	_	1413	1624	
apacity/Lane Group	513	1643	 	138	1644		436	639	<u> </u>	514	591	
ow Ratio	0.2	0.3	 	0.0	0.2	├──	0.0	0.0		0.0	0.1	
c Ratio	0.24	0.74	-	0.04	0.50	 -	0.01	0.02		0.00	0.16	 -
Factor	1.000	1.000	 	1.000	1.000	 	1.000	1.000	 	1.000	1.000	-
	3	3	}	3	3		3	3	 -	3	3	
rrival Type		 	┼	1.00	1.00	 	 	 		+	1.00	-
atoon Ratio	1.00	1.00	 	 	 		1.00	1.00		1.00		<u> </u>
Factor	1.00	1.00	}	1.00	1.00		1.00	1.00		1.00	1.00	├-
1 	0.7	8.1	├	0.0	4.6	 	0.0	0.1		0.0	1.0	 -
<u> </u>	0.3	0.5	<u> </u>	0.2	0.5		0.3	0.4	ļ	0.3	0.4	ļ
2 	0.1	1.3	 	0.0	0.5		0.0	0.0		0.0	0.1	
Average	0.8	9.4	<u> </u>	0.0	5.1	<u></u> _	0.1	0.1	<u> </u>	0.0	1.0	<u> </u>
ercentile Back of Queue (95th	percentile)	,					-,		 -		ү	
*	2.1	1.9	<u> </u>	2.1	2.0		2.1	2.1		2.1	2.1	
ack of Queue	1.7	17.4	<u> </u>	0.1	9.9		0.1	0.2	<u> </u>	0.0	2.1	<u> </u>
ueue Storage Ratio			т				,	· · · · · · · · · · · · · · · · · · ·	· ·	 .	·r	_
ueue Spacing	25.0	25.0	 	25.0	25.0	<u> </u>	25.0	25.0	 	25.0	25.0	<u> </u>
ueue Storage	0	0	 	0	0		0	0	<u> </u>	0	0	<u> </u>
verage Queue Storage Ratio		<u> </u>	<u> </u>	 	<u> </u>	<u> </u>	<u> </u>	<u> </u>		1	 	<u> </u>
∰% Queue Storage Ratio				1	1			1	1	1	1	-

					HCS+"	DETAIL								
neral informa					 .		Intersec	ormation tion	Million	ns Field Rd at	Access	1		
alyst	MG						Area Ty			er areas	ACCCSS	,		į.
gency of Co.	TASK Eng						Jurisdic	•	Gilben					
te Performed	8/8/2006						Analysis		GiiDei	ļ				parti. 2011
ne Period							Project		Willian Pk Hr-	ns Field Road 2025	at Acces	ss 1 PM		_
lume and Tim	ning Input						<u></u>							
				E8		1	WB			NB			SB	
		L	ſ	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	ŖI
imber of Lanes	s, N1	1		2	0	1	2	0	1	1	0	1	1	
пе Сгоир		L		TR		٢	TR		L	TR		L	TR	
olume, V (vph)		37	0	849	5	5	1517	7 8	5	5	5	8	37	45
Heavy Vehicle	s, %HV	0	\neg	0	0	0	0	0	0	0	0	0	O	
ak-Hour Facto	r, PHF	0.9	2	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
retimed (P) or A	Actuated (A)	A		A	A	A	A	A	A	Α	A	A	A	/20
art-up Lost Tim		2.0	,	2.0		2.0	2.0		2.0	2.0		2.0	2.0	L^{-}
tension of Effe		2.0	,	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
rrival Type, AT		3		3	1	3	3		3	3		3	3	
nit Extension, L	JE	3.0	, 1	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
tering/Metering	g, 1	1.0	00	1.000		1.000	1.000	0	1.00	0 1.000		1.000	1.000	
nitial Unmet Den	-	0.0	,	0.0		0.0	0.0		0.0	0.0	1	0.0	0.0	十二
id / Bike / RTO	R Volumes	0		0	0	0	D	0	0	0	0	0	0	0
ne Width		12.	o	12.0	1	12.0	12.0		12.0	12.0	T	12.0	12.0	
arking / Grade /	e vviotiti king / Grade / Parking			0	N	N	0	N	N	0	N	N	0	N
irking Maneuve											1			1,
ses Stopping,		0		0		0	0		0	0	1	0	0	
in. Time for Per	destrians, Gp		•	3. <i>2</i>			3.2			3.2			3.2	
nasing	EW Perm	EB Only			3	T 0	4	NS Pe	rm	06	T	07	1	08
	G = 25.0	G= 10.0		G =		G=		G = 20.	0	G =	G=	:	G=	
iming	Υ =	Y =		Y =	· · ·	Y =		Y =		Y =	Υ=		Y =	
ration of Analy	ysis, T = 0.25			ļ						Cycle Length	, C = 55	5.0		
ane Group Cap	pacity, Control De	elay, and LC	S Det	erminat	ion									
				EB			WB		<u> </u>	NB	т ==	 	SB	
		LT		Н	RT	LT	TH	RT	LT	TH	RT	LT_	TH 532	
fjusted Flow R		402		28		5	1658		5	10	 	9		
ane Group Cap	pacity, c	466		543		148	1643	-	138	639	 	514	595	
∕c Ratio, X		0.86	0.5			0.03	1.01		0.04	0.02	ļ	0.02	0.89	-
tal Green Rati		0.64	0.4			0.45	0.45	 	0.36	0.36	 	0.36	0.36	+-
Jniform Delay, d		19.5	11.			8.3	15.0		11.3	11.2		11.2	16.5	
Progression Fac		1.000		000		1.000	1.000	 -	1.000	1.000		1.000	1.000	+-
elay Calibration		0.39	0.1			0.11	0.50	 	0.11	0.11	 	0.11	0.42	
ncremental Dela		15.3		2.5	······	0.1	24.5		0.1	0.0	 	0.0	16.0	
nitial Queus De	lay, d ₃	0.0	0.			0.0	0.0	 	0.0	0.0	 	0.0	0.0	4
		34.8		1.5		8.4 A	39.5 D	 	11.4	11.2	 	11.2	32.5	
ontrol Delay	ane Group LOS			C B				<u> </u>	В	В		В	C	
ane Group LOS										11.3			22 1	
ane Group LOS			18.5				9.4						32.1	
ane Group LOS							9.4 D 0.93			B ction LOS	<u>-</u>		C	_5



Ĭ

BACK-OF-QUEUE WORKSHEET General Information ≆oject Description Williams Field Road at Access 1 PM Pk Hr-2025 Average Back of Queue EB WB NΒ SB LT TH RT LT TH RT TH RT LŢ TH RT LT Lane Group TR L TR L L TR TR 0.0 tial Queue/Lane 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Flow Rate/Lane Group 5 1658 402 928 5 10 9 532 tflow/Lane 1898 325 1898 733 1413 1636 380 1758 Capacity/Lane Group 466 1643 148 1643 138 639 514 595 bw Ratio 0.0 0.5 0.3 0.5 0.0 0.0 0.3 v/c Ratio 0.03 0.86 0.56 1.01 0.04 0.02 0.02 0.89 actor 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 Arrival Type 3 3 3 3 3 3 3 atoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 F Factor 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 2.6 *5*.5 0.0 13.3 0.1 0.0 0.1 7.7 0.3 0.5 0.2 0.5 0.4 0.2 0.3 0.4 1.7 0.6 0.0 7.7 0.0 0.0 2.4 0.0 6.1 0.0 21.0 0.1 0.1 0.1 10.1 Percentile Back of Queue (95th percentile) 1.9 1.7 2.1 2.1 2.1 1.8 Back of Queue 8.5 11,7 0.1 35.4 0.1 0.2 18.6 0.2 ueue Storage Ratio Queue Spacing 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 peue Storage 0 0 0 0 0 0 0 0

pyright © 2005 University of Florida, All Rights Reserved

Average Queue Storage Ratio

HCS+™ Version 5.2

Generated: 11/8/2006 5:33 AM

					HCS+	DETAIL								
General Informa	tion					 		ormation		E 215-1-1				······································
Analyst	MG						Intersec			n Field Rd at i	Power Roa	ď		<u> 5</u>
Agency or Co.	TASK Eng						Area Ty			er areas				
Date Performed	8/8/2006						Jurisdic		Gilber	t				8
Time Period							Analysi	s Year						<u> </u>
							Project	D		ms Field Road k Hr-202 5	at Power	Koad		
Volume and Tim	ina loout			·		-	<u> </u>		74977	TH LULU				
	<i>y</i>		T	EB			WB			NB		Ī	SB	· · · · ·
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	BI
Number of Lanes	. N1		1	3	0	1	3	0	1	3	0	1	3	★
Lane Group	<u>,</u>		L	TR		L	TR		L	TR	\vdash	L	TR	
Volume, V (vph)			336	258	476	10	111	1	26		46	2	315	200
% Heavy Vehicle	e %HV		0	0	0	0	0	0	0	0	0	0	0	┯
Peak-Hour Facto			0.92	0.92	0.92	0.92	0.92	0.92	0.92		0.92	0.92	0.92	0.92
Pretimed (P) or A	`		A	A	A	A	A	A	A	A	A	A	A	
Start-up Lost Tim			2.0	2.0	- ^-	2.0	2.0	- ^-	2.0	2.0	 	2.0	2.0	
Extension of Effe			2.0	2.0	+-	2.0	2.0		2.0	2.0	 	2.0	2.0	┼
	Clive Green, e			3		3	3		3	3	 	3	3	
Arrival Type, AT			3.0	3.0		3.0	3.0	+-	3.0	3.0	 	3.0	3.0	
Unit Extension, U												 	+	
Fittering/Metering			1.000	1.000	<u>'</u>	1.000	—├	′ 	1.00		┼	1.000	1.000	+
Initial Unmet Den			0.0	0.0		0.0	0.0	 	0.0	0.0	 	0.0	0.0	<u> </u>
Ped / Bike / RTO	R Volumes		0	0	60	0	0	0	0	0	40	0	0	10
	ane Width		12.0	12.0		12.0	12.0		12.0		 	12.0	12.0	
Parking / Grade /			N	0	N	N	0	N N	N	0	N	N	0	N
Parking Maneuve			<u> </u>	Щ								_	ļ	-
Buses Stopping,			0	0		0	0		0		<u>}</u>	0	0	
Min. Time for Peo	destrians, G _P		<u> </u>	3.2			3.2			3.2		<u> </u>	3.2	
Phasing	EW Perm	. W	B Only	Only 03		04	4	NS Pe	m	NB Only		07	0)8 <u> </u>
Timing	G = 37.2	G =	3.0	G=		G=		G = 25.0)	G = 10.4	G =		G =	
Timing	Y = 4	Y =	0	Y =		Y =		Y = 4		Y = 0	Y=		Y =	
Duration of Analy	sis, T = 0.25									Cycle Length	, C = 83.6	3		
Lane Group Cap	oacity, Control D	elay, a	nd LOS		ation									
		L	1	EB			WB	1 85		NB		<u> </u>	SB	_
,		\dashv	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	+ 1
Adjusted Flow Ra			365	732		11	122	 	290	794	<u> </u>	2	655	
Lane Group Cap	асту, с		567	2090		390	2733	 	453	1546	├──	136	1437	+
v/c Ratio, X			0.64	0.35	<u> </u>	0.03	0.04	 	0.64	0.51		0.01	0.46	T T
Total Green Rati		-+	0.44	0.44	<u> </u>	0.53	0.53	-	0.47	0.30	<u> </u>	0.30	0.30	1 -
Uniform Delay, d			18.0	15.3	 	13.7	9.5	 	25.7	24.3	 	20.6	23.8	+
Progression Fac			1.000	1.000		1.000	1.000	 	1.000	1.000	 	1.000	1.000	F
Delay Calibration			0.22	0.11		0.11	0.11	ļ <u>.</u>	0.22	0.12	<u> </u>	0.11	0.11	<u></u> ,
Incremental Dela	ıy, d ₂		2.5	0.1		0.0	0.0		3.0	0.3	<u> </u>	0.0	0.2	
Initial Queue Del	lay, d ₃		0.0	0.0		0.0	0.0	<u> </u>	0.0	0.0		0.0	0.0	
Control Delay			20.6	15.4		13.8	9.5		28.7	24.6		20.7	24.0	
Lane Group LOS	3		С	В		В	A		С	С		С	С	
Approach Delay			17.	1		9	.9			25.7			24.0	
Approach LOS			8			·	A			С			С	ſ
Intersection Dela	ıy		21.	4		<i>X_c</i> =	0.70	 	Interse	ction LOS			C	
Copyright © 2005 Unive	ersity of Florida, All Rig	hts Rese	ved					HCS+T#	Version 5.2	,		Ger	neraled: 11/8/	2006 5:33

General Information

roject Description Williams Field Road at Power Road AM Pk Hr-2025

		EB			WB		<u> </u>	NB			SB	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
ane Group	L	ΊR		L	TR	<u> </u>	L	TR		L	TR	
itial Queue/Lane	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
low Rate/Lane Group	365	732		11	122		290	794		2	655	
atflow/Lane	1275	1723		737	1897		960	1897		455	1763	
apacity/Lane Group	567	2090		390	2733		453	1546		136	1437	
ow Ratio	0.3	0.2		0.0	0.0		0.3	0.2		0.0	0.1	
√c Ratio	0.64	0.35		0.03	0.04		0.64	0.51		0.01	0.46	Π
actor	1.000	1.000		1.000	1.000]	1.000	1.000		1.000	1.000	
\rrival Type	3	3		3	3		3	3		3	3	
atoon Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
F Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
di	6.6	4.1		0.1	0.5		4.0	5.6		0.0	4.5	
3	0.5	0.6		0.4	0.7		0.4	0.5		0.2	0.4	
12	0.8	0.3		0.0	0.0		0.7	0.5		0.0	0.4	
Average	7.4	4.4		0.1	0.5		4.7	6.1		0.0	4.9	
Percentile Back of Queue (95th	percentile)				<u>, I </u>							
1%	1.9	2.0		2.1	2.1		2.0	1.9	<u></u>	2.1	2.0	I^{-}
ack of Queue	14.1	8.7		0.3	1.1		9.2	11.7		0.1	9.6	1
ueue Storage Ratio												
lueue Spacing	25.0	25.0		25.0	25.0		25.Q	25.0		25.0	25.0	
Leue Storage	0	0		a	0		0	0		0	0	
verage Queue Storage Ratio												
% Queue Storage Ratio					1		1					

Copyright © 2005 University of Florida, All Rights Reserved

HCS+™ Version 5.2

Generated: 11/8/2006 5:34 AN

				Н	CS+- DE	TAILED F	REPORT	·							_
						Sit	e informa	ation	ASIE E	ield Rd at Po	wer Ro	ad			
neral information	MG						ersection		Milliother a						
alyst .	MG TASK Eng					1	ea Type		Gilbert	2,000				,	
endy or ou.	8/8/2006						risdiction		Silver					1	
ic , chames	[J/d/2003					i	ralysis Ye	ear 1	Williams	Field Road a	d Powe	r Road			
ne Period						Pı	oject ID	j	PM Pk H	r-2025					
														B	
olume and Timing	Input	—т		EB			WB			NB	DT	LT			RT
		ŀ	LT	TH	RT	LŤ	TH	RT	LT	TH	RT	1		3	<u>E</u>
			1	3	0	1	3	0	1	3	O	+ '-		R	
umber of Lanes, N	<u> </u>	- 	<u></u>	TR		L	TR	<u> </u>	L_	TR		4			800
ane Group			250	203	451	10	269	1	399	552	9	<u> </u>	+-	0	 -
olume, V (vph)			0	0	0	0	0	0	0	0	0	0			0.92
. Heavy Vehicles,			0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		A 0).52 Att
eak-Hour Factor,			0.92 A	A	A	A	А	Α	A	A	A	A		2.0	7.
retimed (P) or Act			2.0	2.0	1	2.0	2.0		2.0	2.0	 	2.0	-+	2.0	—
Start-up Lost Time	, lt		2.0	2.0	 	2.0	2.0		2.0	2.0	 	2.0		3	-
xtension of Effect	ive Green, e		3	3	 	3	3		3	3	 	3	+	3.0	
Arrival Type, AT			3.0	3.0	 	3.0	3.0		3.0	3.0	↓	3.0		.000	_
Jnit Extension, UE			ļ	1,000	┼	1.000	1.000		1.000	1.000	 	1.00	- +		╬┈
iltering/Metering,			1.000	0.0	+	0.0	0.0		0.0	0.0	<u> </u>	0.0	-	0.0	10
Initial Unmet Dem			0.0	0.0	60	0	0	0	0	0	0	0		0	10
Ped / Bike / RTOF	Volumes		0	12.0	- °° -	12.0	12.0		12.0	12.0		12.		12.0	F.
Lane Width			12.0	0	- N	N	0	N	Ν	0	N			<u> </u>	
Parking / Grade /			N_	┿╩┈	- ''- -		 		T_{-}			-			-
Parking Maneuve			+	10	- 	10	0		٥	0			0	0	<u> </u>
Buses Stopping,	Ne	_	10	3.2		 -	3.2		\top	3.2				3.2	_
Min. Time for Peo	lestrians, Gp				03	1 04	···	NS Per	m	NB Only		07		.08	╩
Phasing	EW Perm	╄	02		03	G=		G = 25.0)	G = 13.0		G =		G =	
	G = 23.0	G=		G=		Y=		Y = 4		Y = 6		Y =		Y =	
Timing	Y = 4	Y =		Y =		1,-				Cycle Leng	th, C =	75.0			
Duration of Anal	ysis, T = 0.25													SB	
Lane Group Ca	pacity, Control L	Delay, a	and LOS	Determin EB	auon		WB			NB	1 100		LT	TH	\mathbf{T}
		ł	LT	TH	RT	LT	TH	RT	LT	TH	R	'	4	1439	十
A Day of the Plant	late v		272	646		11	293	<u> </u>	434	610	╫		252	1592	+
Adjusted Flow R			329	1431		191	1586		510	2891	+		0.02	0.90	†;
Lane Group Car	Jacky, 0		0.83	0.45		0.06	0.18		0.85	0.21	+		0.33	0.33	+
v/c Ratio, X	tio alC		0.31	0,31	T	0.31	0.31		0.56	0.56		_	16.8	23.9	+
Total Green Ra			24.1	20.9		18.4	19.1	<u> </u>	24.7	8.2			1.000	1.000	+
Uniform Delay,	otor DE		1.000	1.000	1	1.000:	1.000		1.000				0.11	0.43	+
Progression Fa			0.36	0.11		0.11	0.11		0.38	0.11	_		0.0	7.7	╅
Delay Calibration			15.8	0.2	 	0.1	0.1		13.0	_			0.0	0.0	+
Incremental De			0.0	0.0	1	0.0	0.0		0.0	0.0	-		16.8	31.5	十
Initial Queue D	elay, d ₃		40.0	21.2	+	18.5	19.2		37.					C 31.3	十
			D D	C	-	В	В		D	A	L_		В		
Control Delay	Lane Group LOS						19.1			20.5				31.5	
Lane Group Lo			26.7												
	ay			6.7 C			В			С				C	

General Information

Croject Description Williams Field Road at Power Road PM Pk Hr-2025

Average Back of Queue										_		_
		EB			WB			NB			SB	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
ane Group	L	TR		L	TR		L	TR		L	TR	
itial Queue/Lane	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Flow Rate/Lane Group	272	646		11	293		434	610		4	1439	
atflow/Lane	1074	1712		623	1899		912	1895		757	1753	
Capacity/Lane Group	329	1431		191	1586		510	2891		252	1592	
ow Ratio	0.3	0.1		0.0	0.1		0.5	0.1		0.0	0.3	1
u/c Ratio	0.83	0.45		0.06	0.18		0.85	0.21		0.02	0.90	Î
Factor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Arrival Type	3	3		3	3		3	3		3	3	
atoon Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
F Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
21	5.3	4.0		0.2	1.6		4.9	2.3		0.1	10.5	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	0.3	0.4		0.2	0.4		0.4	0.6		0.3	0.4	
22	1.3	0.3		0.0	0.1		2.0	0.2		0.0	3.0	
Average	6.5	4.3		0.2	1.7	-	5.9	2.5		0.1	13.5	
Percentile Back of Queue (95th	percentile)	<del></del>	_	<del>' </del>	<del>'</del> -	<del>/</del>	<u></u>	<u> </u>	<del></del>	<u> </u>	<u> </u>	
<b>E</b> **	1.9	2.0	]	2.1	2.0		1.9	2.0		2.1	1.8	T
Back of Queue	12.6	8.5		0.4	3.6		13.1	5.0		0.1	24.0	
ueue Storage Ratio		-										
Queue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
ueue Storage	O	0		0	0		0	0		0	0	
verage Queue Storage Ratio												
¥% Queue Storage Ratio												

Copyright © 2005 University of Florida, All Rights Reserved

HCS+™ Version 5,2

Generated: 11/8/2006 5:35 AM

:		TWO-WAY STO	P CONTROL	SUMMA	RY			
neral Information			Site Info	rmation				57)
Analyst	MG		Intersect	ion		Cooley Loop	S/Cooley Loc	
Agency/Co.	TASK Eng		Jurisdicti			Gilbert		
ite Performed	8/8/2006		Analysis	Year		2025		
alysis Time Period	AM PK Hr-20							
Project Description Cooley Loo		oop West AM Pk Hr-202						
and the street in the street i					Cooley Loop Wes	<u> </u>		
ersection Orientation: East-W	est		Study Pe	riod (hrs):	0.25			<u> </u>
vehicle Volumes and Adjust	ments							
Major Street		Eastbound				Westboun	<u></u>	
vement	1	2	3		4	5		6
i	L	T	R		L	Т		R
/olume (veh/h)	5	5	5		5	307		0.92
7-ak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
urty Flow Rate, HFR (veh/h)	5	5	5		5	333		45
Percent Heavy Vehicles	0				0			EE
dian Type				Undivid	ded			- Lange
Channelized			0					0 =
anes	1	1	0		1	1		0
nfiguration	L		TR		L		1"	TR
stream Signal		0				0		
Minor Street	T T	Northbound			_	Southbour	nd	
vement	7	8	9		10	11		12
	L	Т	R		L	Т	<u> </u>	R F
Volume (veh/h)	5	93	53		5	455		5 mer
Peak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
urly Flow Rate, HFR (veh/h)	5	101	57		5	494		5
_rcent Heavy Vehicles	0	0	0		0	0		0 🗀
Percent Grade (%)		0		1		0		
red Approach		N			_	N	1	
Storage		0				0		
RT Channelized			0			Ì		0
nes	1	1	0		1	1		0
nfiguration	L		TR		L	<u> </u>		TR
Delay, Queue Length, and Leve	l of Service							
proach	Eastbound	Westbound		Northbou	und		Southbound	1
vement	1	4	7	8	9	10	11	12
ane Configuration	Ĺ	L	L		TR	L		T
veh/h)	5	5	5		158	5		499
(m) (veh/h)	1192	1623	85		652	413		5/8
417	0.00	0.00	0.06		0.24	0.01		0.51
% queue length	0.01	0.01	0.18		0.95	0.04		10.96
Control Delay (s/veh)	8.0	7.2	50.0		12. <b>3</b>	13.8		47
rs	A	Α	E		₿	В		E
proach Delay (s/veh)		-		13.4			46.8	5
Approach LOS				В			E	<b></b> ,
right © 2005 University of Florida, All Ri	ghts Reserved	-		HCS+TN	Version 5.2		Generated: 1	1/8/2008 5:36

eneral Information			Site Info	mation				
nalyst	MG		Intersection	on	<del></del>	Cooley Loop	S/Cooley Lo	ор W.
gency/Co.	TASK Eng		Jurisdictio			Gilbert		
ete Performed	8/8/2006		Analysis `	<u>rear</u>		2025		
nalysis Time Period	PM PK Hr-20			·				
roject Description Cooley Loo	ρ South at Cooley Lo	oop West PM Pk Hr-20		th Change Co				
st/West Street: Cooley Loop Sersection Orientation: East-W				od (hrs): 0.2	ooley Loop Wes	<u>sr</u>		
			julius) i cir	04 (1113). 0.2	.5			
ehicle Volumes and Adjust	ments	Eastbound		<del></del>		Westbour	ــــــــــــــــــــــــــــــــــــــ	<del></del>
ajor Street	1	2	3		4	Westoodi 5	1	6
DVEITIEN	i	<u> </u>	R		L	<del>                                     </del>		R
lume (veh/h)	5	5	5		5	64		17
ak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92
ourly Flow Rate, HFR (veh/h)	5	5	5		5	69		18
rcent Heavy Vehicles	0		_		0	<del>                                     </del>		_
ledian Type			·	Undivided				
Ţ Channelized			0					0
nes	1	7	0		1	1		·0
onfiguration	L		TR		L.			TR
stream Signal		O				0		
inor Street		Northbound				Southbou	nd	
overnent	7	. 8	9		10	11		12
	<u> </u>	T	R		_ <u>_</u>	T		R
diume (veh/h) eak-Hour Factor, PHF	5 0.92	406 0.92	224 0.92		5 0.92	124 0.92		5 0.92
gurly Flow Rate, HFR (veh/h)	5	441	243		5	134	<del> </del> -	5
rcent Heavy Vehicles	0	0	0		0	0	<del></del>	0
ercent Grade (%)	<del></del>					J 0		
		<del></del>	<del></del>		<del>_</del>	4		
ered Approach		N O			<del></del>	N		
Storage T Channelized		<u> </u>	0			0		0
nes	1	1	1 0		1	1		0
onfiguration	<del>'</del> L		TR			<del>                                     </del>	<del></del>	TR
elay, Queue Length, and Leve	<del></del>		111					
proach	Eastbound	Westbound		Northbound			Southbound	
ovement	1	4	7	8	9	10	11	12
ne Configuration	L	L	L		TR	L	_	TR
veh/h)	5	5	5		684	5		139
(m) (veh/h)	1522	1623	680		861	222	<del>                                     </del>	787
3	0.00	0.00	0.01		0.79	0.02	<del> </del>	0.18
% queue length	0.01	0.01	0.02		8.40	0.07	<del> </del>	0.64
ntrol Delay (s/veh)	7.4	7.2	10.3		23.2	21.6	<del>                                     </del>	10.6
os	A	A	В	···	C	C	<del> </del>	B
Proach Delay (s/veh)				23.1		<del>                                     </del>	10.9	<u> </u>
pproach LOS			1	С		<del></del>	В	

C	<del> </del>				HCS-	" DETA	ILED RE									
General Inform								nform								
Aπalyst Agency or Co.	MG						Inters Area	ection			r Rd/Cool	∍y Loo	p Souti	7		. 1
•	TASK Eng						ı	liction			er areas					
Date Performed	8/8/2006									Gilber	Ţ.					)#S
Time Period							_ I	sis Ye	ar	Recke	r Road at	Cooley	(1000	South		
						·	Proje	et ID			Hr-2025		, соор	30007		
Volume and Ti	ming Input															<b>1</b> (
				EB		[	W	3			NB				SB	
<del></del>	····	<u>-</u>	LT	TH	RT	L	Th	1	RT	LT	TH		RT	LT	TH	RT
Number of Lane	s, N ₁		1	1	0	1	. 1		0	1	2		0	1	2	u
Lane Group	<del> </del>		L	TR		L	TR			L	TR			L	TR	
Volume, V (vph			7	12	28	72	2 10	3	80	15	1090	)	61	64	869	3
% Heavy Vehicle	es, %HV		0	0	0	0	0		0	0	0		o	0	0	- J
Peak-Hour Fact	or, PHF		0.92	0.92	0.92	0.92	2 0.92	: [	0.92	0.92	0.92	0	.92	0.92	0.92	0.92
Pretimed (P) or	Actuated (A)		Α	A	A	A	A		Α	A	A	T	A	A	A	W 6
Start-up Lost Ti	ne, lı		2.0	2.0		2.0	2.0			2.0	2.0	一		2.0	2.0	1
Extension of Eff	ective Green, e		2.0	2.0		2.0	2.0			2.0	2.0	$\neg$		2.0	2.0	<del>                                     </del>
Arrival Type, AT			3	3		3	3			3	3	$\neg \vdash$		3	3	
Unit Extension,	UE		3.0	3.0		3.0	3.0	_		3.0	3.0			3.0	3.0	1
iltering/Meterin	g, I		1.000	1.000	,	1.01	00 1.00	00		1.000	<del></del>	<del>,  </del>		1.000	1,000	+-
nitial Unmet De	mand, Qь		0.0	0.0		0.0	0.0			0.0	0.0	_		0.0	0.0	
Ped / Bike / RT0	R Volumes		0	0	0	0	0		0	0	0	<u> </u>	10	0	0	10
ane Width			12.0	12.0	1	12.0	12.0	-		12.0	12.0	$\dashv$		12.0	12.0	10
Parking / Grade	/ Parking		N	0	N	N	0		N	N	0	$\dashv$	N	N	0	N
Parking Maneuv				+-	<del>                                     </del>			-+		<del>                                     </del>	+	-+-		<del>                                     </del>	<del>                                     </del>	<del>  ~</del>
3uses Stopping	Nв	-	0	0	+	0	0	$\dashv$		0	- 0			0	10	
Vin. Time for Pe	destrians, Gp			3.2		<del>-   -</del>	3.2	<del>,                                    </del>		+	3.2			<del>                                     </del>	3.2	<u> </u>
hasing	EW Perm	WB	Only		03	<del>- 1'</del>	04		IS Pem	<del></del>	Excl. Le	<b>—</b>	T	07		
	G = 25.2	G = 3		G=	00	G =	04	<del>-                                    </del>	35.0		G = 10.4	1	G =	01	G=	8
iīmin <b>g</b>	Y = 4	Y = 0	·	Υ=		Y =		\Y=			Y = 0		Y =	-	Y =	
Duration of Anal		11-0		<del>-   ' -</del>		1'-	·	1, -	<del></del>	<del></del> -			<u> </u>			76.
	pacity, Control D	olav an	dinsi	Potormin	ation						Cycle Len	in, C	= 87.0	) 		
	pacity, common b	ciay, air	<u>u 200</u>	EB	auun	1	WB		Т		NB			<del></del>	SB	
			.T	TH	RT	LT	TH	R	T	LT	TH	TF	शं	LT	TH	E:
djusted Flow R	ale, v		8	43		78	199			16	1208	$\top$		70	1018	1 1
ane Group Cap	acity, c	3	40	525		559	700		$\neg \uparrow$	419	1547	十		412	1535	
/c Ratio, X		O.	02	0.08		0.14	0.28	$\top$	一十	0.04	0.78	十		0.17	0.66	
otal Green Rat	io, g/C	O.	31	0.31		0.39	0.39	$\top$		0.61	0.43	_		0.61	0.43	
niform Delay,	J ₁	19	2.6	20.0		16.7	16.8	1	<del></del>	17.0	20.0	$\top$		22.3	18.6	
rogression Fac	tor, PF	1.	000	1.000		1.000	1.000	$\top$		1.000	1.000	_		1.000	1.000	11-
elay Calibratio	1, k	O.	11	0.11		0.11	0.11	1	$\neg \uparrow$	0.11	0.33	十		0.11	0.24	<del> </del>
ncremental Dela	y, d ₂		0.0	0.1		0.1	0.2	1-	一十	0.0	2.7	<del> </del>		0.2	1.1	1
nitial Queue De			0	0.0		0.0	0.0	<del>                                     </del>	<del> </del>	0.0	0.0	+		0.0	0.0	<del> </del>
ontrol Delay			9.7	20.1	<b></b>	16.9	17.1	╁		17.0	22.7	+		22.5	19.7	1
ane Group LOS	<u> </u>		3	C		В	B	+-		B	C C	+		1	19.7 B	<del>  -</del>
		<del>-   :</del>	20,0		<u></u>		17.0	ــــــــــــــــــــــــــــــــــــــ					-	С	19.9	
oproach Delav				•		•	, , . u		- 1	2	22.6			1	19.3	
pproach Delay	-	-	С			<del>                                     </del>	В		$\dashv$		С				В	72

General Information

Recker Road at Cooley Loop South AM Pk Hr-2025

ď	verag	ie Ba	ck o	f Qı	ieue
н	veray		UR U		70.00

Average Back of Queue							_					
		EB		<u>                                     </u>	WB			NB			SB	
<u> </u>	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Lane Group	L	TR		L	TR		L	TR		L	TR	
tial Queue/Lane	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Flow Rate/Lane Group	8	43		78	199	}	16	1208		70	1018	
Tatflow/Lane	1100	1701		1417	1775		692	1894		680	1879	
Capacity/Lane Group	340	525		559	700		419	1547		412	1535	
ow Ratio	0.0	0.0		0.1	0.1		0.0	0.3		0.1	0.3	
v/c Ratio	0.02	0.08		0.14	0.28		0.04	0.78		0.17	0.66	
actor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Arrival Type	3	3		3	3		3	3		3	3	1
It - atoon Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
PF Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
<u>।</u>	0.1	0.7		1.1	3.1		0.1	12.3		0.6	9.7	
10	0.3	0.4		0.5	0.5		0.4	0.6		0.4	0.6	
Q ₂	0.0	0.0		0.1	0.2		0.0	1.9		0.1	1.1	
Average	0.1	0.7	1	1.2	3.3		0.2	14.2		0.7	10.7	
Percentile Back of Queue (95th	percentile)						·	<u> </u>		<del></del>	<del></del>	
110 ¹ %	2.1	2.1		2.1	2.0		2.1	1.8		2.1	1.8	$\prod$
Back of Queue	0.3	1.5		2.4	6.6		0.3	25.2		1.5	19.7	
ueue Storage Ratio												
Queue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
ueue Storage	0	0		0	0		0	0		o	0	
Average Queue Storage Ratio												
₩ Queue Storage Ratio							1					

Copyright © 2005 University of Florida, All Rights Reserved

HCS+™ Version 5.2

Generated: 11/8/2008 5:37 /

						HCS+	DETAIL	ED RE	<u>EPO</u> F	T							
General Informa	tion					<del>-</del>		Site	Infon	nation			•				
Analyst	MG							Inter	sectio	п	Reck	er Rd/Cooley	Loop	South			
Agency or Co.	TASK Eng							Area	Туре	!	All of	her areas					1
Date Performed	8/8/2006							Juris	dictio	п	Gilbe	rt					
Time Period								Anal	ysis Y	ear							
								Prois	ect ID		Reck	er Road at Co	ooley	Loop S	South		
Volume and Tin	du m to more							1.1.57			PM F	k Hr-2025			<del></del>	·	
volume and Tin	ing input				EB			34	/B		т	LID.					_
			LT	_	TH	DT	+	- ·		D.T.	+	NB	Τ.		<u> </u>	SB	_
N				+		RT	LT		H	RT	1.7			RT	LT	TH	Ļ
Number of Lanes	5, N1		1	+	1	0	1	_   1		0	1	2		0	1	2	
Lane Group	<del> </del>			$\dashv$	TR	↓	L	TI		<u> </u>	L L	TR	_		L	TR	L
Volume, V (vph)			30	4	62	107	81		36	186	21	810		72	131	1433	-
% Heavy Vehicle			0	1	0	0	0	- 0		0	0	) 0		0	0	0	
Peak-Hour Facto	<u> </u>		0.92	10	0.92	0.92	0.92	0.9	32	0.92	0.92	0.92	0.	92	0.92	0.92	0.
Pretimed (P) or A	ctuated (A)		Α	$\perp$	Α	Α	Α	Α	l	A	A	A		4	Α	A	7
Start-up Lost Tim	e, l1		2.0		2.0		2.0	2.	0		2.0	2.0			2.0	2.0	T
Extension of Effe	ctive Green, e		2.0	$\Box$	2. <b>0</b>		2.0	2.	0		2.0	2.0	Τ		2.0	2.0	Τ
Arrival Type, AT			3		3		3	3			3	3	丅		3	3	上
Unit Extension, L	E		3.0		3.0		3.0	3.	0		3.0	3.0	┪		3.0	3.0	†
Filtering/Metering	<u>, 1</u>		1.000	7	1.000	T	1.00	1.0	000	T	1.0	00 1.000	1		1.000	1.000	T
Initial Unmet Der	nand, Qь		0.0	一	0.0	1	0.0	О.	o	T	0.0		$\top$		0.0	0.0	†
Ped / Bike / RTO	R Volumes		0	7	0	60	0	0	i	o	0	0	14	10	0	0	1
Lane Width			12.0	_	12.0	<del> </del>	12.0	12.	.0	<del> </del>	12.0	12.0	+		12.0	12.0	╁╌
Parking / Grade /	Parking		N	$\top$	0	N	N	0		N	N	0	-	V	N	0	١,
Parking Maneuve			+ '-	十		+~	<del>+ '''</del>	╅		<del>  '''</del>	+	<del> </del>	—	<u> </u>	<del>  '`</del>	<del>                                     </del>	╀
Buses Stopping,			0	$\dashv$	0		0		0		ō	0	╫		0	0	╁
Min. Time for Pe			<del></del>		3.2	<u> </u>	┵		1.2	<u> </u>	+ '	3.2				<del>!</del>	.Щ
		T	<u></u>				<del></del>		1.2	1 1 m m				т—		3.2	_
Phasing	EW Perm	+	VB Only		0:	<u> </u>		4		NS Perr	n	Excl. Left		<del> </del>	07	0	8
Timing	G = 25.2	₩	3.0		G ≃		G =		_	= 35.0		G = 10.4		G =		G=	
	Y = 4	Υ =	0	_	Y =		Υ =		Y	= 4	· · · · · ·	Y = 0		Υ =		Y =	
Duration of Analy				<u>i</u>								Cycle Lengt	h, C =	= 81.6	<u> </u>		
Lane Group Cap	acity, Control D	elay,	and LOS			on		145									
		- 1	LT	E T)-		DT.	LT	WB		DT	1.7	NB TI	1 -		ļ	SB	П
Adjusted Flow Ra	ite v		33	11		RT	88	TH 241		RT	LT	TH	+	T	LT	TH 1562	╀
Lane Group Cap			306	54			492	655	-		23	915			142		╀
v/c Ratio, X		$\dashv$		_		·		<del> </del>		<del></del> ł	412	1543	+		450	1551	╀
Total Green Rati	- NC	-	0.11	0.21			0.18	0.37	+		0.06	0.59	1		0.32	1.01	╀
			0.31	0.31			0.39	0.39			0.61	0.43	ļ		0.61	0.43	╀
Uniform Delay, d		_	20.2	20.9			18.7	17.5	_ _		24.8	17.8	$\bot$		19.5	23.3	╀
Progression Fact			1.000	1.0			1.000	1.000	<u>'</u>		1.000	1.000	╄-		1.000	1.000	╀
Delay Calibration			0.11	0.11	<del></del>		0.11	0.11	_		0.11	0.18			0.11	0.50	1
ncremental Dela			<b>0</b> .2	0.:			0.2	0.4			0.1	0.6			0.4	24.6	丄
nitial Queue Del	ay, d ₃		0.0	0.0			0.0	0.0		]	0.0	0.0			0.0	0.0	L
Control Delay			20.3	21.	.1		18.9	17.8			24.8	18,5			19.9	47.9	
ane Group LOS			С	C			B	В		7	С	В	T		В	D	$\Gamma$
Approach Delay			20.	9	-		1	8.1				18.6			<u> </u>	45.6	
<u>::-</u>																_	
Approach-LOS			· C	-				B				В				D	

General Informat	tion
Spoject Description	Recker Road at Cooley Loop South PM Pk Hr-2025

Äverage	Back	of	Queue

Average Back of Queue									_		_	
		EΒ			WB			NB			SB	
	LT	тн	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
Lane Group	L	TR		L	TR		L_	TR		L	TR	
itial Queue/Lane	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Flow Rate/Lane Group	33	118		88	241		23	915		142	1562	
itflow/Lane	990	1777		1246	1661		680	1889		743	1899	
Capacity/Lane Group	306	549		492	655		412	1543		450	1551	
ow Ratio	0.0	0.1		0.1	0.1		0.0	0.3		0.2	0.4	
v/c Ratio	0.11	0.21		0.18	0.37		0.06	0.59		0.32	1.01	
ractor	1.000	1.000		1.000	1.000		1.000	1.000		1.000	1.000	
Arrival Type	3	3		3	3		. 3	3		3	3	
atoon Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
≧F Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
3	0.5	2.0		1.2	3.9		0.2	8.3		1.3	18.6	
<u> </u>	0.3	0.5		0.4	0.5		0.4	0.6		0.4	0.6	
52	0.0	0.1		0.1	0.3		0.0	0.8		0.2	8.1	
Average	0.6	2.1		1.3	4.2		0.2	9.1		1.5	26.6	1
Percentile Back of Queue (95th	percentile)	·		· · · ·	<del></del>			· · · · · · · · · · · · · · · · · · ·		•		
d _r r	2.1	2.0	<u> </u>	2.1	2.0		2.1	1.9		2.1	1.6	[
Back of Queue	1.2	4.3		2.7	8.2		0.5	17.0		3.1	43.6	
nueue Storage Ratio												
Queue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
nueue Storage	0	0		0	0		0	0		0	0	
Verage Queue Storage Ratio												
			1									_

Queue Storage Ratio Copyright © 2005 University of Florida, All Rights Reserved

HCS+™ Version 5.2

Generated: 11/8/2008 5:37 AM

eneral Information			Site Info	rmation			·					
nalyst	MG		Intersect			Cooley Loop	S./Cooley Loop					
gency/Co.	TASK Eng	<del></del>	Jurisdict		···		Gilbert					
ate Performed	8/8/2006		Analysis	Үеаг		2025	*******					
nalysis Time Period	AM PK Hr-2	025										
oject Description Cooley Loo	ρ South at Cooley L	oop East AM Pk Hr-202	25									
st/West Street: Cooley Loop S	South		North/So	uth Street: C	ooley Loop Ea	ıst						
ersection Orientation: East-M	<u>fest</u>		Study Pe	riod (hrs): 0.	25							
hicle Volumes and Adjust	ments											
ajor Street	1	Eastbound			-	Westboun	d					
ovement	1	2	3		4	5	T T	6				
	L	Ţ	R		L	T		R				
iume (veh/h)	30		5			<del></del>		<u> </u>				
ak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		2.92				
ourly Flow Rate, HFR (veh/h)	32	0	5		0	0		0				
rcent Heavy Vehicles	0	_	_		0	-	<del>-  </del>					
edian Type				Undividea	;	<del></del>	, <del></del>	<u>e.</u> _				
Channelized			0					0				
nes	0	0	0		0	0		0 -				
onfiguration	LTR	LR										
stream Signal		0				0						
nor Street		Northbound			Y-2'	Southbour	nd					
ovement	7	8	9		10	11		12				
	L	Т	R		L_	T		R				
lume (veh/h)	19	336			· · · · · · · · · · · · · · · · · ·	105		7 -				
ak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92	(	0.92				
ourly Flow Rate, HFR (veh/h)	20	365	0		0	114		7				
rcent Heavy Vehicles	0	0	0		0	0		0 =				
rcent Grade (%)		0				0						
ared Approach		N				N						
Storage		0				0						
Channelized			0					0				
nes	1	1	0		0	1		0 10				
nfiguration	L	T	1			<del>                                     </del>		TR				
lay, Queue Length, and Leve	l of Service											
proach	Eastbound	Westbound		Northbound	l		Southbound					
ovement	1	4	7	В	9	10	11	12				
ne Configuration	LTR		L	T				7				
veh/h)	32		20	365	1			121				
(m) (veh/h)	1636		744	813				821				
	0.02		0.03	0.45				0. ਰਤ				
% queue length	0.06		0.08	2.35				0.52				
ontrol Delay (s/veh)	7.2		10.0	13.0	1			1				
S	A		А	В				В				
proach Delay (s/veh)	-	_		12.8			10.1					
proach LOS			T	В			В					

in and information			OP CONTRO	<del> </del>			<del></del>					
neral Information	100			ormation	<del></del>		- (-	<u> </u>				
nalyst gency/Co.	MG TASK Eng		Intersec Jurisdic			Cooley Loop Gilbert	S./Cooley Lo	юр Е.				
ate Performed	8/8/2006	<del></del>	Analysis		<del></del>		2025					
alysis Time Period	PM PK Hr-2	025				2020						
roject Description Cooley Loo	o South at Cooley L	oop East PM Pk Hr-202	?5									
st/West Street: Cooley Loop S	outh			uth Street:	Cooley Loop Eas	st		•				
ersection Orientation: East-W	<u>'est</u>		Study Pa	eriod (hrs): (	0.25							
ehicle Volumes and Adjust	ments											
ajor Street		Eastbound				Westbour	d					
vement	1	2	3		4	5		6				
	L	Ť	R		L_	<u> </u>		R				
lume (veh/h) ak-Hour Factor, PHF	18	200	5	······································		1 22						
	0.92	0.92	0.92	-	0.92	0.92		0.92				
burly Flow Rate, HFR (veh/h)	19	0	5		0	0		0				
rcent Heavy Vehicles	0				0			_				
edian Type				Undivide	ed	· · ·						
Channelized			0					σ				
nes	0	0	0		0	0		0				
nfiguration	LTR	LR	<del>-  </del>	<del></del>		1	<del></del>					
stream Signal		0	<del>                                     </del>	<del></del>		0						
inor Street	<del>                                     </del>	Northbound		<del></del>		Southbour						
ovement	7	8	9	<del></del>	10	30umbour	10	12				
1	L	T	R		L	T		R				
dlume (veh/h)	24	247				376		42				
eak-Hour Factor, PHF	0.92	0.92	0.92		0.92	0.92		0.92				
ourly Flow Rate, HFR (veh/h)	26	268	0		0	408		45				
rcent Heavy Vehicles	0	0	0		0	0		0				
ercent Grade (%)		0				O						
ared Approach		N				N						
Storage		0				0						
T Channelized			0					0				
nes	1	1	0		۵	1		.0				
nfiguration	L	T	<u> </u>					TR				
play, Queue Length, and Level	of Service							7.4				
proach	Eastbound	Westbound	,	Northbour	nd		Southbound					
pvement	1	4	7	8	9	10	11	12				
ne Configuration	LTR		L	T	<del></del>	<del>- </del>	<del> </del>	TR				
<del>}</del>	<del></del>		<del></del>	<del> </del>	<del> </del>	<del></del>	<del> </del>					
veh/h)	19		26	268			<u> </u>	453				
(m) (veh/h)	1636	<u> </u>	407	846				862				
<i>g</i>	0.01	L	0.06	0.32				0.53				
% queue length	0.04		0.20	1.37		1		3.13				
ontrol Delay (s/veh)	7.2		14.4	11.2		<del>                                     </del>	<del>                                     </del>	13.7				
OS	A		B	B			<del>                                     </del>	13.7 B				
proach Delay (s/veh)		_	-	11.5	<u> </u>	1	13.7	В				
ļ <del></del>		<del> </del>	-		<del></del>			-				
oproach LOS			<u> </u>	В		<u> </u>	В					

·					HCS+"	DETAILE								
General Informa	tion						Site Info		Danler	r Rd at Boulev	ami Poor			_{
Analyst	MG					l	Intersecti Area Typ			r Roat bodievi er areas	ard Road			<u> </u>
Agency or Co.	TASK Eng						Jurisdicti		Gilber					
Date Performed	8/8/2006					Ì	Analysis		Gilbei	•				
Time Period							-		Recke	er Road at Bou	ievard Ro	ad AM		-
						<u>.</u> 1	Project II	)	Pk Hr					
Volume and Tim	ing Input													
				EB		ļ	WB	1	<del> </del>	NB		1	SB	
			LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RI.
Number of Lanes	, N ₁		1	1	-	1	1		1	2	0	2	2 TR	<u> </u>
Lane Group	<u></u>		<u></u>	TR	<del> </del>	L	TR	<del> </del> _	L	TR		L		
Volume, V (vph)			214	3	48	58	2	310	13		36	128	790	<b>├</b> ───
% Heavy Vehicle	s, %HV		0	0	0	0	0	0	0	0	0	0	0	ે કે.⊸
Peak-Hour Facto			0.92	0.92	0.92	0.92	0.92	0.92	0.92	<del></del>	0.92	0.92	0.92	0.92
Pretimed (P) or A			A	A	A	A	A	A	A	A	A	A -	A 20	1 -
Start-up Lost Tim		·	2.0	2.0		2.0	2.0	<del></del>	2.0	2.0	<del> </del>	2.0	2.0	<del> </del>
Extension of Effe	ctive Green, e		2.0	2.0	<del></del>	2.0	2.0		2.0	2.0	ļ. — —	2.0	2.0	<del> </del> -
Arrival Type, AT			3	3		3	3		3	3	<b> </b>	3	3	( ;
Unit Extension, U			3.0	3.0	<del></del>	3.0	3.0		3.0	3.0	<del> </del>	3.0	3.0	<del> </del>
Filtering/Metering	), l		1.000	1,000		1.000	1.000		1.00		ļ	1.000	1.000	
Initial Unmet Der	nand, Qb		0.0	0.0		0.0	0.0	_	0.0		<del> </del>	0.0	0.0	<b></b>
Ped / Bike / RTO	R Volumes		0	0	0	- 0	0	0	0	0	10-	0	0	10
Lane Width	···		12.0	12.0		12.0	12.0		12.0		<del> </del>	12.0	12.0	<del>                                     </del>
Parking / Grade /	Parking		N	0	N	N	0_	N	N N		<u> </u>	N .	0	N
Parking Maneuve	ers, Nm				<u> </u>				<del>-</del>		<del> </del>	<del>                                     </del>	<del> </del>	╂╼╤╌
Buses Stopping,			0	0		0	0		<u> </u>			<del>-</del> -	1 0	<u> </u>
Min. Time for Pe	destrians, G _P		<u> </u>	3.2		<u> </u>	3.2			3.2	<del></del>		3.2	
Phasing	EW Perm	VVE	3 Only		03	04		NS Per		Excl. Left		07		)B
Timing	G = 25.2	G≃.	3.0	G =	<u></u> _	G =		G = 35.0		G = 10.4	G =		G≔	
\	Y = 4	Y = (	<u> </u>	Y =		Y =		Y = 4		Y = 0	Y=		Y≃	<u> </u>
Duration of Anal										Cycle Length	, C = 81	.6		
Lane Group Ca	pacity, Control De	elay, al	nd LOS I		ation		WB			NB		<del></del>	58	
		⊢	LT	TH T	RT	LT	TH	RT	LŤ	TH	RT	LT	TH	T
Adjusted Flow R	ate v		233	55		63	339		14	886		139	904	
Lane Group Car			230	504		548	638	<del> </del>	454	1542		1108	1540	
v/c Ratio, X		-+,	1.01	0.11		0.11	0.53	T	0.03	0.57	$\sqcap$	0.13	0.59	F-4
Total Green Rat	io, a/C		2.31	0.31		0.39	0.39	1	0.61	0.43	]	0.61	0.43	
Uniform Delay,			8.2	20.2		16.8	18.9		15.0	17.7		15.4	17.8	LE
Progression Fac			1.000	1.000		1.000	1.000	<del>                                     </del>	1.000	1.000		1.000	1.000	
Delay Calibratio			0.50	0.11		0.11	0.13	1	0.11	0.17		0.11	0.18	
Incremental Del		-+	62.7	0.1		0.1	0.9		0.0	0.5		0.1	0.6	
Initial Queue De		$\neg +$	0.0	0.0		0.0	0.0	1	0.0	0.0		0.0	0.0	
Control Delay		-+	90.9	20.3	f	16.9	19.8		15.0	18.2	1	15.4	18.4	
Lane Group LO	S		F	С	<b> </b>	В	В	1	В	В	1	B	В	
Approach Delay			77.		<b></b>		9.3		1	18.1	· <del></del>		18.0	
Approach LOS		+	E		<del></del>	<del></del>	8		1	В			В	<u>r</u> :
- FP. 040,1 200		<del></del>							<del>1</del>				C	
Intersection Del	av	ı	24.	7		X.=	0.63		Inters	ection LOS				

#### **BACK-OF-QUEUE WORKSHEET** ceneral Information Spject Description Recker Road at Boulevard Road AM Pk Hr-2025 verage Back of Queue ₽B WB SB NB πH LT RT LT TH RT LT TH RT LT ΤH RT L ine Group TR L TR L TR L TR 0.0 🌃 tia) Queue/Lane 0.0 0.0 0.0 0.0 0.0 0.0 0.0 ow Rate/Lane Group 233 55 63 339 904 886 139 14 triow/Lane 745 1631 1389 1617 749 1887 942 1886 apacity/Lane Group 230 504 548 638 454 1542 1108 1540 .......................w Ratio 0.2 0.3 0.0 0.0 0.0 0.2 0.1 0.3 c Ràtio 1.01 0.11 0.11 0.53 0.03 0.57 0.13 0.59 actor 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 3 3 3 3 3 3 3 3 rival Type atoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 Factor 5.3 0.9 0.9 5.9 0.1 8.0 0.6 8.2 0.5 0.3 0.4 0.5 0.4 0.6 0.5 0.6 3.0 0.1 0.1 0.6 0.0 0.8 0.1 0.8 0.9 ~Average 0.9 6.4 0.1 8.7 0.7 9.0 ercentile Back of Queue (95th percentile) 1.9 2.1 2.1 1.9 2.1 1.9 2.1 1,9 ick of Queue 15.5 2.0 1.9 12.4 16.8 0.3 16.4 1.5 ⊋ueue Storage Ratio ieue Spacing 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 Q ⊒ieue Storage 0 0 0 0 0 0 0

myright @ 2005 University of Florida, All Rights Reserved

erage Queue Storage Ratio
% Queue Storage Ratio

HCS+™ Version 5.2

Generated: 11/8/2006 5:38 AM

					HC3+	DETAIL	ED KEP	UKI							
General Informa	ation							ormation							
Analyst							Interse	tion	Recke	r Rd at Boule	vard Roa	d -			
Agency or Co.	TASK Eng						Area Ty	rpe	All oth	All other areas					
Date Performed	8/8/2006						Jurisdio	tion	Gilber					_	
Time Period							Analysis Year								
							Project	ID	Recke						
12.1						<del></del>			Pk Hr-	2025					
Volume and Tin	ning input						145			h:17		1		_;₹_	
				EB	· ·	_	WB	-	<del>   </del>	NB	<del></del> -	<del> </del>	SB		
		<u> </u>	Г	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
Number of Lanes	s, N1	1		1	0	1	1	0	1	2	0	1	2		
Lane Group		L		TR		L	TR			TR	<u> </u>	L	1R		
Volume, V (vph)		11	8	3	28	107	3	189	26	596	74	445	945	1	
% Heavy Vehicle	s, %HV	0		0	0	0	0	0	0	0	0	0	0		
Peak-Hour Facto	or, PHF	0.93	2	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Pretimed (P) or A	Actuated (A)	A		Α	A	A	A	A	A	A	А	A	A	× III	
Start-up Lost Tim		2.0	)	2.0		2.0	2.0		2.0	2.0	<u> </u>	2.0	2.0		
Extension of Effe		2.0	,	2.0	1	2.0	2.0		2.0	2.0	1	2.0	2.0	<del>                                     </del>	
Arrival Type, AT		3		3	$T^{-}$	3	3	_	3	3	1	3	3	1	
Unit Extension, l		3.0		3.0	+-	3.0	3.0	_	3.0	3.0	1	3.0	3.0	<del>                                     </del>	
Filtering/Metering		1.0		1.000	+-	1.000		,	1.00		<del> </del>	1.000	1.000	+-	
	I Unmet Demand, Qs		_	0.0	<del> </del>	0.0	0.0	<del></del>	0.0	0.0	<del> </del> -	0.0	0.0	<b></b>	
		0.0		·	<del> </del>	<del></del>			<del></del>		40		<del> </del>	1 10	
Ped / Bike / RTO	R Volumes	0	_	0	0	0	0	0	0	0	40	0	0	10	
ane Width		12.	0	12.0		12.0	12.0		12.0	12.0	<b></b>	12.0	12.0		
arking / Grade / Parking		.N		0	N	N	0	N	N	0	N	N	0	N	
Parking Maneuv	arking Maneuvers, Nm			<u> </u>									ــــــ	<u> </u>	
Buses Stopping,	Nв	0		0		٥	0		0	0		0	0		
Min. Time for Pe	destrians, Gp			3.2			3.2			3.2			3.2		
Phasing	EW Perm	WB Only	,	0:	3	0.	1	NS Pe	:LIII)	Excl. Left		. 07		8 5	
<del>-</del>	G = 25.2	G = 3.0		G=		G=		G = 35.	0	G = 10.4	G=		G≃		
Timing	Y = 4	Y = 0		Υ=		Y =		Y = 4		Y = 0	Y =	:	Y =		
Duration of Anal	vsis. T = 0.25	<u> </u>		+			-	1		Cycle Length	. C = 81	1.6		Ū	
	pacity, Control De	view and I C	S De	terminat	ion										
Laire Group ca	pagity, 00/12 01 01	lay, di,d LC	000	EB	301,		WB		Τ -	NB			SB	·	
		LT	T	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH		
Adjusted Flow R	ate, v	128	$\top$	33		116	208	1	28	685		484	1267		
Laws Casses Cas	acity, c	332	1	507		569	639	1	412	1539		532	1508	Ţ_,.	
Lane Group Cap		1 00-		$\longrightarrow$		0.20	0.33	1	0.07	0.45		0.91	0.84		
			0.	07		10.20					<del></del>	0.61	0.43	$\top$	
v/c Ratio, X	io, g/C	0.39	<del>-</del> [-	07 31		<del></del>	-	<del>                                     </del>	0.61	0.43	ı			1	
v/c Ratio, X Total Green Rat		0.39 0.31	Ö.	31		0.39	0.39	-		0.43	<del> </del>		20.8		
v/c Ratio, X Total Green Rat Uniform Delay, c	1	0.39 0.31 22.1	0.	.31 9.9		0.39 17.0	0.39 17.2		22.3	16.4		24.7	20.8	7	
v/c Ratio, X Total Green Rat Uniform Delay, o Progression Fac	d ₁ dor, PF	0.39 0.31 22.1 1.000	0. 1:	31 9.9 .000		0.39 17.0 1.000	0.39 17.2 1.000		22.3 1.000	16.4		24.7 1.000	1.000	-	
v/c Ratio, X Total Green Rat Uniform Delay, o Progression Fac Delay Calibratio	d ₁ tor, PF n, k	0.39 0.31 22.1 1.000 0.11	0. 1: 1	.000 11		0.39 17.0 1.000 0.11	0.39 17.2 1.000 0.11		22.3 1.000 0.11	16.4 1.000 0.11		24.7 1.000 0.43	1.000 0.38		
v/c Ratio, X Total Green Rat Uniform Delay, o Progression Fac Delay Calibratio	d ₁ dor, PF n, k ay, d ₂	0.39 0.31 22.1 1.000 0.11 0.7	0. 1: 1	31 9.9 .000 11 0.1		0.39 17.0 1.000 0.11 0.2	0.39 17.2 1.000 0.11 0.3		22.3 1.000 0.11 0.1	16.4 1.000 0.11 0.2		24.7 1.000 0.43 19.7	1.000 0.38 4.4		
v/c Ratio, X Total Green Rat Uniform Delay, o Progression Fac Delay Calibratio Incremental Delay Initial Queue De	d ₁ dor, PF n, k ay, d ₂	0.39 0.31 22.1 1.000 0.11 0.7	0. 1: 1 0.	31 9.9 .000 11 0.1		0.39 17.0 1.000 0.11 0.2 0.0	0.39 17.2 1.000 0.11 0.3		22.3 1.000 0.11 0.1 0.0	16.4 1.000 0.11 0.2 0.0		24.7 1.000 0.43 19.7 0.0	1.000 0.38 4.4 0.0		
v/c Ratio, X Total Green Rat Uniform Delay, o Progression Fac Delay Calibratio Incremental Dela Initial Queue De Control Delay	d ₁ ctor, PF n, k ay, d ₂ lay, d ₃	0.39 0.31 22.1 1.000 0.11 0.7 0.0 22.9	0.	31 9.9 .000 11 0.1 1.0 19.9		0.39 17.0 1.000 0.11 0.2	0.39 17.2 1.000 0.11 0.3 0.0 17.5		22.3 1.000 0.11 0.1 0.0 22.4	16.4 1.000 0.11 0.2 0.0 16.7		24.7 1.000 0.43 19.7 0.0 44.4	1.000 0.38 4.4 0.0 25.2		
v/c Ratio, X Total Green Rat Uniform Delay, c Progression Fac Delay Calibratio Incremental Dela Initial Queue De Control Delay	d ₁ ctor, PF n, k ay, d ₂ lay, d ₃	0.39 0.31 22.1 1.000 0.11 0.7	0.	31 9.9 .000 11 0.1		0.39 17.0 1.000 0.11 0.2 0.0	0.39 17.2 1.000 0.11 0.3		22.3 1.000 0.11 0.1 0.0	16.4 1.000 0.11 0.2 0.0		24.7 1.000 0.43 19.7 0.0	1.000 0.38 4.4 0.0 25.2 C		
v/c Ratio, X Total Green Rat Uniform Delay, o Progression Fac Delay Calibration Incremental Delay Initial Queue De Control Delay Lane Group LO	d ₁ tor, PF n, k ay, d ₂ lay, d ₃	0.39 0.31 22.1 1.000 0.11 0.7 0.0 22.9	0.	31 9.9 .000 11 0.1 1.0 19.9		0.39 17.0 1.000 0.11 0.2 0.0 17.2 B	0.39 17.2 1.000 0.11 0.3 0.0 17.5		22.3 1.000 0.11 0.1 0.0 22.4	16.4 1.000 0.11 0.2 0.0 16.7		24.7 1.000 0.43 19.7 0.0 44.4	1.000 0.38 4.4 0.0 25.2		
Progression Fac Delay Calibratio Incremental Dela Initial Queue De	d ₁ tor, PF n, k ay, d ₂ lay, d ₃	0.39 0.31 22.1 1.000 0.11 0.7 0.0 22.9	0.	31 9.9 .000 11 0.1 1.0 19.9		0.39 17.0 1.000 0.11 0.2 0.0 17.2 B	0.39 17.2 1.000 0.11 0.3 0.0 17.5		22.3 1.000 0.11 0.1 0.0 22.4	16.4 1.000 0.11 0.2 0.0 16.7 B		24.7 1.000 0.43 19.7 0.0 44.4	1.000 0.38 4.4 0.0 25.2 C		

HCS+* DETAILED REPORT

eneral Information												
Spject Description Recker Road at	Boulevard Road	PM Pk Hi	-2025									
verage Back of Queue												
· 1		EB			WB			NB		SB		
<u></u>	LT .	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT
ane Group	L	TR		L	TR	-	<u> </u>	TR		L	TR	<del> </del>
tial Queue/Lane	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	<u> </u>
low Rate/Lane Group	128	33		116	208		28	685		484	1267	
Stflow/Lane	1076	1641		1440	1619		680	1884		878	1846	
apacity/Lane Group	332	507		569	639		412	1539		532	1508	
ow Ratio	0.1	0.0		0.1	0.1		0.0	0.2		0.6	0.4	
/c Ratio	0.39	0.07		0.20	0.33		0.07	0.45		0.91	0.84	
actor	1.000	1.000		1.000	1.000		1,000	1.000		1.000	1.000	
rrival Туре	3	3		3	3		3	3		3	3	
atoon Ratio	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
F Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
,	2.3	0.5		1.6	3.3		0.3	5.7		5.2	13.5	
<u> </u>	0.3	0.4		0.5	0.5		0.4	0.6		0.4	0.6	
hl2	0.2	0.0		0.1	0.2		0.0	0.5		3.0	2.6	
Average	2.5	0.6		1.7	3,5		0.3	6.2		8.2	16.0	
ercentile Back of Queue (95th	percentile)		,									
₹*	2.0	2.1		2.0	2.0		2.1	1.9		1.9	1.7	$\Gamma$
ack of Queue	5.0	1.2		3.6	7.0		0.6	11.9		15.3	28.0	
ueue Storage Ratio												
lueue Spacing	25.0	25.0		25.0	25.0		25.0	25.0		25.0	25.0	
ueue Storage	0	0		0	0		О	0		0	0	
verage Queue Storage Ratio												
7% Queue Storage Ratio												T

poyright @ 2005 University of Florida, All Rights Reserved

HCS+™ Version 5.2

Generated: 11/8/2006 5:40 AN

· <del></del>						HCS+	DETAIL					_		<u> </u>				
i <u>eneral Informa</u>								Site In		מסט	Rector	Rd at Pecos	s ₽^	ad				
Analyst	MG							Area T			All othe		s no	<b>-</b> 0			. 🖭	
Agency or Co.	TASK Eng							Jurisdia	•		Gilbert	, 4,045						
late Performed	8/8/2006										Gilbert						<u> </u>	
Time Period								Analysis Year  Recker Road at Pecos Road AM Pk								<u>_</u>		
1								Project	ID		Hr-202.			1000				
olume and Tin	ning Input																)# S	
					EB			WB				NB				SB		
			LT		TH	RT	LT	TH		RT	LT	TH	<u> </u>	₹Ţ	ŁT	TH	ŔŢ	
lumber of Lane	5, N1		1		3	0	1	3		0	1	2	1	0	1	2	. <b>1</b> 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
ane Group			Ĺ	7	TR		L	TR			L	TR			L	TR		
'olume, V (vph)			44		1228	190	149	741		30	264	593	2	219	39	343	- A	
6 Heavy Vehicle	es, %HV		0		0	Ö	0	0	T	0	0	0		0	0	0	7	
eak-Hour Facto	or, PHF		0.92	0	0.92	0.92	0.92	0.92	0	0.92	0.92	0.92	0.	92	0.92	0.92	0.92	
retimed (P) or A	Actuated (A)		A		A	Α	Ä	A	o	Α	A	A	17	4	A	A	Jan 1	
Start-up Lost Tin			2.0	7	2.0		2.0	2.0	$\neg$		2.0	2.0	Τ		2.0	2.0	<b> </b>	
xtension of Effe			2.0	<b>-</b> [:	2.0	t	2.0	2.0	$\dashv$		2.0	2.0	†		2.0	2.0		
rrival Type, AT			3		3		3	3	$\dashv$		3	3	$\top$		3	3	E 9	
Init Extension, U			3.0		3.0		3.0	3.0	1		3.0	3.0	十		3.0	3.0	<del>†</del>	
iltering/Metering	<del></del>		1.000	-	1.000	<b> </b>	1.000		<del>,  </del>		1.000		十		1.000	1.000	je.	
nitial Unmet De	<b>=</b> :		0.0		0.0		0.0	0.0	$\dashv$		0.0	0.0	+		0.0	0.0	1	
Ped / Bike / RTOR Volumes		0		0	0	0.0	0.0	十	0	0.0	0.0	+	10	0.0	0.0	10		
ane Width		12.0		2.0	1-	12.0	12.0	$\dashv$	<u> </u>	12.0	12.0	+		12.0	12.0	10		
Parking / Grade / Parking		N N		0	N	N N	0	$\dashv$	N	N	0	+-	V	N	0	- N		
arking Maneuvers, Nm		+ ' '	$\dashv$	<del>-</del>	<del>                                     </del>	+ ''	<del>Ť</del>	$\dashv$	••	<del>                                     </del>	+ -	+		<del>                                     </del>	ᡰ᠊ᢆ	+~		
Buses Stopping,			-	+	0	<del>                                     </del>	Ö	0	+		10	0	┿		0	0		
fin. Time for Pe			+	_1_	3.2	1	<del>-                                     </del>	3.2			+ ~	3.2	1		<del>                                     </del>	3.2		
	<del> </del>	-	xcl. Left	<del></del>		<del></del>	0			S Perm	<del></del>	Excl. Left			07		08 =	
Phasing	EW Perm	+			03	·		-	+		<del></del> -			  C =	07	G =		
riming .	G = 25.2	₩	3.0		G =		G=		G = 15.0 Y = 4		G = 5.4 G = Y = 0 Y =							
3A	Y = 4	Y =	· U		Y = Y =			Y = 4			Y = 0 Y = Cycle Length, C = 56.6					Y =		
Duration of Anal	<del></del>	4			=				<del></del>			ycle Length	), C :	= 56.6	) ————————————————————————————————————		<b>E</b> 1	
ane Group Ca	pacity, Control De	:ray,	ano LOS	Deter Et		<u>ол</u> -	<del> </del>	WB		1		NB			т	ŞB		
			LT	TH		RT	LT	TH	R	т 🖁	LT	TH TH	R	RT.	LT	TH	T	
djusted Flow R	tate, v		48	154			162	838	1		287	840	m		42	518	<b>†</b>	
ane Group Car			426	225			357	2291	1	$\neg \uparrow$	434	925	1		434	919	<b>†</b> ~	
/c Ratio, X	<del></del>		0.11	0.68			0.45	0.37	1		0.66	0.91	1		0.10	0.56		
Total Green Rat	io, g/C		0.57	0.45			0.57	0.45	1	-	0.43	0.27	$\vdash$		0.43	0.27	<del>1 - '</del>	
Jniform Delay, o			9.1	12.5			17.3	10.4	+	-	18.6	20.1	$\vdash$	-	16.7	18.0	<b>†</b> ;=	
Progression Fac		_	1.000	1.00			1.000	1.000	+	-	1.000	1.000	$\vdash$		1.000	1.000	+4:	
Delay Calibratio			0.11	0.25			0.11	0.11	+	_	0.24	0.43	╁		0.11	0.16	+	
- Sing Cambiano			0.11	0.23			0.11	0.11	┪	+	3.7		╁		<del></del>	0.10	+	
acramostal Dal			0.0	0.0				-	+			12.6	╀		0.1		╅╧	
				U.U			0.0	0.0	+-		0.0	0.0	╄		0.0	0.0	+	
nitial Queue De				40	, 1			10.5		1	22.3	32.8	1		16.8	18.8	╌╌	
nitial Queue De Control Delay	elay, d ₃		9.3	13.	4		18.2		╅			<del> </del>	+					
nitial Queue De Control Delay Lane Group LO	elay, d ₃		9.3 A	В	4		В	В			С	С			В	В	=	
initial Queue De Control Delay Lane Group LO Approach Delay	elay, d ₃		9.3 A 13	В 3	4		B 1	B 1.7			3	0.1			В	18.6	<u>                                     </u>	
Incremental Del initial Queue De Control Delay Lane Group LO: Approach Delay Approach LOS Intersection Del	elay, d ₃		9.3 A	<i>B</i>	4		B 1	B 1.7 B	<u>j</u>		3		<u> </u>		В			

eneral Information							··						
roject Description Recker Road at	Pecos Road Alv	Pk Hr-20	125										
verage Back of Queue			_										
<b>=</b>		ЕВ			WB			NB	1 57	SB			
ane Group	LT L	TH TR	RT	LT L	TH	RT	LT L	TH	RT	LT	TH	RT	
tial Queue/Lane	0.0	0.0	<del> </del>	0.0	0.0		0.0	0.0		0.0	0.0		
low Rate/Lane Group	48	1542	<del> </del>	162	838	·	287	840	<del></del>	42	518		
atflow/Lane	750	1861		629	1888		1007	1834	<del> </del>	1007	1820	-	
Capacity/Lane Group	426	2258	<del> </del>	357	2291		434	925	<del> </del>	434	919	-	
ow Ratio	0.1	0.3	<del>                                     </del>	0.3	0.2	<del> </del> -	0.3	0.2	<del> </del>	0.0	0.1	<b></b> _	
/c Ralio	0.11	0.68		0.45	0.37		0.66	0.91		0.10	0.56		
Factor	1.000	1.000	<del></del>	1.000	1.000		1.000	1.000		1,000	1.000	-	
Arrival Type	3	3	<del> </del>	3	3		3	3		3	3	$\vdash$	
atoon Ratio	1.00	1.00	+	1.00	1.00	<del> </del>	1.00	1.00	<u> </u>	1.00	1.00	<del> </del>	
PF Factor	1,00	1.00	-	1.00	1.00		1.00	1.00	<b>}</b>	1.00	1.00	<del> </del>	
Ž	0.3	7.1		1.2	3.2		2.9	6.7	<u> </u>	0.4	3.7	├	
	0.3	0.5	1	0.3	0.5		0.3	0.3	<del> </del>	0.3	0.3	├	
]	0.0	1.0		0.2	0.3		0.6	2.4		0.0	0.4	├—	
Average	0.4	8.1	<del>                                     </del>	1.4	3.5	<b>-</b>	3.5	9.1	<del> </del>	0.4	4.1	├	
		1 0.7	. <u>}</u>	1.4	3.5	<u> </u>		9.1	<u></u>	0.4	4.7		
Percentile Back of Queue (95th	2.1	1.9	1	2.1	2.0	1	2.0	1.9	<del>                                     </del>	2.1	2.0	Γ	
17 ⁶ Back of Queue	0.8	15.2	<del> </del>	2.9	6.9	<del>                                     </del>	6.9	16.9	}	0.9	8.2	$\vdash$	
Jueue Storage Ratio		1	1	1				1	<u> </u>		1	<u> </u>	
Queue Spacing	25.0	25.0	1	25.0	25.0	1	25.0	25.0	Ţ	25.0	25.0	T	
ueue Storage	0	0		0	D	<u> </u>	0	0	<u> </u>	0	0	+-	
verage Queue Storage Ratio	_	t —	<del> </del>	+	<del>                                     </del>		<del>                                     </del>	<del>                                     </del>	1	<del>                                     </del>	<del> </del>		
7% Queue Storage Ratio	_	<del> </del>	+	<del> </del>	<del> </del>	<del>                                     </del>	†		1	+	<del> </del>	+	

					HCS+~ [	ETAILE								
eneral informat	tion				<u>-</u>		Site Info.		Dooks	Rd at Pecos	Road			<del></del> -
Analyst	MG						Intersecti Area Typ			r areas er areas	Nodu			<b>f</b> ii ,
∮gency or Co.	TASK Eng						Jurisdicti		Gilbert					
ate Performed	8/8/2006						Analysis		OUDELL					10
rime Period							-		Recke	r Road at Pec	os Road	IPM Pk		ــــ
-							Project II	) 	Hr-202	5				
olume and Tim	ing Input											1		
				EB		<del> </del>	WB		+	NB	RT	LT	SB	DT
			LT	TH	RT	LT_	TH	RT	LT	TH	<b></b>		TH 2	RT.
lumber of Lanes	, N1		1	3	0_	1	3	0	1 1	2	0	1		
Lane Group			L	TR	<b>_</b>	L	TR	<del> </del> _	L	TR	405	L	TR	2/2-
Volume, V (vph)			115	896	232	238	1355	64	255		125	26	613	نـــــــــــــــــــــــــــــــــــــ
% Heavy Vehicles	s, %HV		0	0_	0	0	0	0	0	0	0	0	0	6-
Peak-Hour Facto	r, PHF		0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Pretimed (P) or A	ctuated (A)		A	A	A	<u> </u>	A	A	A	A	A	A	A	
Start-up Lost Tim			2.0	2.0		2.0	2.0	_	2.0	2.0	<del>                                     </del>	2.0	2.0	<del> </del>
Extension of Effe	ctive Green, e		2.0	2.0		2.0	2.0		2.0	2.0	+	2.0	2.0	<del> </del>
Arrival Type, AT			3	3		3	3		3	3	<b></b>	3	3	-
Unit Extension, L	JE		3.0	3.0	<del> </del>	3.0	3.0		3.0	3.0	<del> </del>	3.0	3.0	<del> </del>
Filtering/Metering	g, l		1.000	1.000	1	1.000	1.000		1.00		↓	1.000	1.000	<del>                                     </del>
Initial Unmet Den	nand, Qь		0.0	0.0		0.0	0.0		0.0	0.0	<del> </del>	0.0	0.0	4.0
Ped / Bike / RTO	R Volumes		0	0	0	0	0	0	_ 0	0	40	0	0	10
Lane Width			12.0	12.0		12.0	12.0	<del> </del> -	12.0		1	12.0	12.0	<del> </del>
Parking / Grade /	/ Parking		N	0	N	N	0	N	N	0	N	N	0	N
Parking Maneuve	ers, Nm				1						<del> </del>		<del> </del>	╀╣
Buses Stopping,	Nв		0	0		0			0			0	0	<u> </u>
Min. Time for Pe	destrians, G _P		<u> </u>	3.2			3.2			3.2	<del></del>		3.2	· · ·
Phasing	EW Perm	E	xcl. Left		03	04	<u> </u>	NS Per		Excl. Left		07		)B [
Ti-les	G = 25.2	G=	3.0	G=		G=		G = 15.0	)	G = 5.4	G		G=	
Timing	Y = 4	Υ=	0	Y≃		Y =		Y = 4		Y = 0	Y		Υ≃	
Duration of Analy										Cycle Length	1, C = ⟨	56.6		}
Lane Group Ca	pacity, Control D	elay,	and LOS I		ation		11.5					<del></del>	SB	
		].	<del>-,</del>	EB TH	RT	LT	WΒ	RT	LT	NB NB	RT	LT	TH	F .
Adjusted Flow R	Pata v		LT 125	1226	ΚI	259	1543	<del>  ``</del> -	277	608	<del>† ```</del>	28	755	<del>ऻ</del> ॱ॑
Lane Group Car			357	2233		357	2288	<del>                                     </del>	434	937	1	434	942	<b>T</b> -
	Jacky, L		0.35	0.55		0.73	0.67	<del>                                     </del>	0.64	0.65	<del>                                     </del>	0.06	0.80	
v/c Ratio, X	in alC		0.57	0.55		0.73	0.45	<del>                                       </del>	0.43	0.27	$\top$	0.43	0.27	1
Total Green Rat				11.5		18.5	12.4	<del> </del>	19.6	18.5	1-	15.3	19.4	5
Uniform Delay,			16.2	1.000		1.000	1.000	<del>                                     </del>	1.000	1.000	1	1.000	1.000	1:
Progression Fac			0.11	0.15		0.29	0.25	<del> </del>	0.22	0.23	+	0.11	0.35	1
Delay Calibratio			0.11	0.13	<del> </del>	7.2	0.23	<del>                                     </del>	3.1	1.6	+-	0.1	5.0	
Incremental Del				0.0	<u> </u>	0.0	0.0	+	0.0	0.0	+-	0.0	0.0	<del>†</del> -
Initial Queue De	elay, 0 ₃		0.0		<del>                                     </del>	25.7	13.2	+	22.7	20.1	+	15.4	24.5	
Control Delay			16.8	11.8	<u> </u>	25.7 C	13.2 B	+	C 22.1	C C	+	В	C	i i
F	ະວ		.B		<u> </u>	ļ. ——			┩┷╌	20.9	<del>. L</del>	<del>-  </del>	24.1	
Lane Group LO						1 7	5.0		1	24.5				
Approach Delay			12.				D			C			C	۲
			12. B 16.				B 0.86		lata	C ection LOS			C B	<u>د</u>

### BACK-OF-QUEUE WORKSHEET Seneral Information goject Description Recker Road at Pecos Road PM Pk Hr-2025 ಸೇrage Back of Queue SB EΒ WB NB ΤH ΤH LT RT LT TH RŦ LT TΗ RT LT RT ane Group L TR L TRL L TR TR tial Queue/Lane 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 259 1543 755 low Rate/Lane Group 125 1226 277 608 28 Titflow/Lane 629 1841 629 1886 1007 1856 1007 1866 Sapacity/Lane Group 357 2288 357 2233 434 937 434 942 ∐ow Ratio 0.2 0.4 0.3 0.3 0.2 0.2 0.0 0.2 0.35 0.55 0.73 0.67 0.64 0.65 0.06 0.80 r/c Ratio actor 1.000 1.000 1.000 1.000 1.000 1.000 1.000 1.000 3 3 3 3 3 trival Type 3 3 3 ≟atoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 ೌF Factor 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 0.9 5.2 1.9 7.1 2.8 4.5 0.3 5.8 0.3 0.5 0.3 0.5 0.3 0.3 0.3 0.3 0.2 0.6 0.7 0.9 0.5 0.0 1.3 0.6 1.0 2.6 8.0 7.1 Average 5.8 3.3 5.1 0.3 Percentile Back of Queue (95th percentile) 1.9 2.0 1.9 2.0 2.0 2.1 1,9 lack of Queue 2.1 11.1 5.3 15.1 6.6 9.9 0.6 13.5 ueue Storage Ratio 25.0 25.0 25.0 25.0 25.0 25.0 25.0 25.0 Dueue Spacing Jeue Storage 0 0 0 0 0 0 0 Verage Queue Storage Ratio i% Queue Storage Ratio

opyright @ 2005 University of Florida, All Rights Reserved

HCS+™ Version 5,2

Generaled: 11/8/2006 5;40 AN

MAG Trip Distribution Wednesday, August 2, 2006 Version 1.3.0 9:24 AM Cooley Station Project Name: Project Location: Gilbert, AZ Analyst: SAD Location of Site: TAZ 1562 Development Type being Analyzed: Residential and Employment 47.0% Weighted Employment Forecast Year: 2020 Distance Out from Site (miles): ী NNW NNE % of Trips Bearing 24.1% 17.5% NWW NEE NNE 17.5% NEE 5.0% 27.9% 5.0% SEE 1.0% SSE 3.2% SSW 2.2% 19.1% 1.0% SWW 19.1% NWW 27.9% sww SEE WNN 24.1% 2.2% 3.2% SSE SSW 2 20 15 Santa-.21 Rom 10 Willow Fulch 10 Peron

# APPENDIX C: ADJACENT TRIP GENERATION

3

प्

ī

 
 Daily Rate
 AM Rate
 PM Rate
 % In AM
 % In PM
 Weekday
 AM In AM Out PM In PM Out

 2.28
 0.01
 0.06
 80%
 41%
 228
 1
 0
 2
 4
 Total 228 Trip Rates Acres Amount L.U.C. 412 001 100 9 Adjacent Park

TAZ Parcel # TCID Parcel Type Units
1 1 295 Park Acres
Sum of DUs

Total           Weekday         AM In         AM Out         PM In         PM Out           9,492         144         576         569         307           11,005         149         95         490         531	20,497 293 671 1,060 838
Trip Rates   Trip Rates   Trip Rates   1,413   220   6.72   0.51   0.62   20%   65%   1.16   4.86   61%   48%   48%	
Dibella   TCID Parcel Type   Units Acre   TAZ   Parcel #   TCID Parcel Type   Units Acre   1   Residential   300   Residential   DUs   56.5     2   Commercial   298   Commercial   TGSF   19.3     Sum of DUs   Sum of DUs   Commercial   Sum of DUs   Commercial   Co	Adjacant Reliefing Wich College

232 671 1,060 838	In PM         Weekday         AM In AM Out         PM In PM Out           80%         2,052         339         153         269         67           2,052         339         153         269         67	200
	Trip Rates AM Rate PM Rate % In AM % 530 1.71 0.41 0.28 69% 8	
Adjacent Existing High School	TAZ     Parcel #     TC ID   Parcel Type     Units     Acres Amount I       1     1     302     High School     Students     NA     1200	

Adjacent Trip Generation

Cooley Station Traffic Impact Study
Appendix C
11/2006



# APPENDIX D: ADJACENT PRODUCTIONS AND ATTRACTIONS

Adjacent Park	r Park				ļ					rip Rates					Total		
TAZ	Parcel #		TC ID Parcel Type	Units	Acres	Amount	Amount % Attractions Weekday		AM In	AM Out	PM In	FM Out	PM Out   Weekday   AM In   AM Out   FM In   FM Out	AM In	AM Out	PM In	"M Out
,	-	295	Park	Acres	100	001	%,001	0	0	0	0	0	228	_	0	2	4
			Sum of DUs	fDU ₃		001		0	0	0	0	٥	228	-	0	2	4
								:									
Dibella									Trip	Trip Productions	15			Trip	Trip Attractions	138	
TAZ	Parcel#	TCD	Parcel #   TC ID   Parcel Type	Units	Acres	Amount	Amount % Attractions   Weekday	Weekday	AM In	AM Out PM In	PM In		PM Out   Weekday   AM In AM Out   PM In   PM Out	AM In	AM Out	PM In I	M Out
-	Residential	300	Residential	DUs	56.5	1,413	5%	9,017	137	547	541	291	475	7	52	28	15
2	Commercial 298	298	Commercial	TGSF	19.3	210.177	20%	5,502	74	48	245	266	5,502	74	48	245	266
			Sum of DUs	r D Us		0		14,520	211	595	786	557	5,977	82	92	274	281
Adjacen	Adjacent Existing High School	gh Schoo	7						Trip	Trip Productions	53			Trip	Trip Attractions	2	
TAZ	Parcel #	TC ID	Parcel # TC ID Parcel Type	Units	Acres	Amount	Amount % Attractions	Weckday	AMIn	AM Out	PM In	PM Out   Weekday   AM In   AM Out   PM In   PM Out	Weekday	AM In	AM Out	PM In P	M Out
_	-	302	302 High School	Students	Ϋ́	1200	85%	308	51	23	40	10	1,744	585	130	228	57
								308	51	23	40	10	1,744	687	130	228	57

### **APPENDIX E:**

FLORIDA DEPARTMENT OF TRANSPORTATION QUALITY/LEVEL OF SERVICE HANDBOOK

## § Quality/Level of Service

HANDBOOK



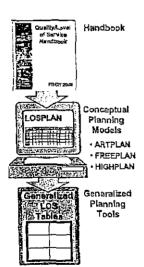


State of Florida
Department of Transportation
2002

# Handbook used for roadway planning and preliminary engineering analyses

This Handbook successfully combines the nation's leading automobile, bicycle, pedestrian, and bus evaluation techniques into a common analysis process.





### **EXECUTIVE SUMMARY**

This Quality/Level of Service Handbook and its accompanying software are intended to be used by engineers, planners, and decision-makers in the development and review of roadway users' quality/level of service (Q/LOS) at planning and preliminary engineering levels. This Handbook provides tools to quantify multimodal transportation service inside the roadway environment (essentially inside the right-of-way).

These updated methods provide the first successful multimodal approach unifying the nation's leading automobile, bicycle, pedestrian and bus Q/LOS evaluation techniques into a common transportation analysis at facility and segment levels. With these professionally accepted techniques, analysts can now easily evaluate roadways from a multimodal perspective, which result in better multimodal decisions for projects in planning and preliminary engineering phases.

Two levels of analysis are included in this Handbook: (1) "generalized" planning and (2) "conceptual" planning. Generalized planning makes extensive use of statewide default values and is intended for broad applications such as statewide analyses, initial problem identification, and future year analyses. Conceptual planning is increasingly more detailed and accurate than generalized planning, but does not involve comprehensive operational analyses.

Generalized planning is most appropriate when a quick, "in the ball park" determination of LOS is needed. Florida's Generalized Tables found in this Handbook are the primary tools for conducting this type of planning analysis. The default values used for the Generalized Tables have been extensively researched and represent the most appropriate statewide values.

Conceptual planning is best suited for obtaining a solid determination of the LOS of a facility. Examples of conceptual planning are preliminary engineering applications, such as determining the design concept and scope for a facility (e.g., 4 through lanes with a raised median and bicycle lane), conducting alternatives analyses (e.g., 4 through lanes undivided versus 2 through lanes with a two-way left turn lane), and determining needs when a generalized planning approach is simply not accurate enough. Florida's LOS software (LOSPLAN),

Implementation schedule

which includes ARTPLAN, FREEPLAN, and HIGHPLAN, is the casy to use tool for conducting these types of evaluations.

The techniques contained in this Handbook and the accompanying software are to be implemented immediately. After September 1, 2002, FDOT will not accept analyses using methods, techniques, volumes, or generalized tables from previous versions of this Handbook.

The most significant difference in this Handbook from previous editions is the multimodal perspective. In addition to traditional "highway" (automobile and truck) LOS analysis, state-of-the-art techniques are now provided allowing a simultaneous evaluation of the LOS for bicyclists, pedestrians, and buses. Although LOS techniques are provided for each roadway mode, FDOT recommends against combining their LOS into one overall roadway LOS. Other significant changes include a new freeway facility planning technique and completely updated software.

The updated methodologies are planning and preliminary engineering applications from the following primary resource documents and analytical techniques using actual Florida roadway, traffic and signalization data:

- 2000 Highway Capacity Manual (HCM2000) methodologies for automobiles and trucks;
- 1999 Transit Capacity and Quality of Service Manual (TCQSM) for buses;
- Bicycle LOS Model, the most used technique in the U.S. to evaluate LOS for bicyclists; and
- Pedestrian LOS Model, the most advanced technique in the U.S. to evaluate LOS for pedestrians.

Also included are Florida's Statewide Minimum LOS Standards for the State Highway System. These standards are required for use on Florida Intrastate Highway System (FIHS) routes.

In order to make future editions of this Handbook and accompanying software even better, FDOT welcomes your review comments and suggestions. Chapter 8 contains a user survey and a software "bug" report form.

### Handbook changes

Multimodal perspective includes bicycles, pedestrians, and buses as well as automobiles.

New freeway facility planning technique and updated software

Analytical methodologies for automobiles, bicycles, pedestrians, and buses.

Florida's LOS standards

### User feedback

Comments and suggestions are welcome.

Implementation schedule

which includes ARTPLAN, FREEPLAN, and HIGHPLAN, is the easy to use tool for conducting these types of evaluations.

### Handbook changes

Multimodal perspective includes bicycles, pedestrians, and buses as well as automobiles.

New freeway facility planning technique and updated software

Analytical methodologies for automobiles, bicycles, pedestrians, and buses.

Florida's LOS standards

### User feedback

Comments and suggestions are welcome.

The techniques contained in this Handbook and the accompanying software are to be implemented immediately. After September 1, 2002, FDOT will not accept analyses using methods, techniques, volumes, or generalized tables from previous versions of this Handbook.

The most significant difference in this Handbook from previous editions is the multimodal perspective. In addition to traditional "highway" (automobile and truck) LOS analysis, state-of-the-art techniques are now provided allowing a simultaneous evaluation of the LOS for bicyclists, pedestrians, and buses. Although LOS techniques are provided for each roadway mode, FDOT recommends against combining their LOS into one overall roadway LOS. Other significant changes include a new freeway facility planning technique and completely updated software.

The updated methodologies are planning and preliminary engineering applications from the following primary resource documents and analytical techniques using actual Florida roadway, traffic and signalization data:

- 2000 Highway Capacity Manual (HCM2000) methodologies for automobiles and trucks;
- 1999 Transit Capacity and Quality of Service Manual (TCOSM) for buses;
- Bicycle LOS Model, the most used technique in the U.S. to evaluate LOS for bicyclists; and
- Pedestrian LOS Model, the most advanced technique in the U.S. to evaluate LOS for pedestrians.

Also included are Florida's Statewide Minimum LOS Standards for the State Highway System. These standards are required for use on Florida Intrastate Highway System (FIHS) routes.

In order to make future editions of this Handbook and accompanying software even better, FDOT welcomes your review comments and suggestions. Chapter 8 contains a user survey and a software "bug" report form.

### GENERALIZED ANNUAL AVERAGE DAILY VOLUMES FOR FLORIDA'S **URBANIZED AREAS***

L	UNIN	TERRU	TED FLO	OW HIGH	WAYS				F	REEWAY	<u> </u>		1
				evel of Serv		_	Interchang	e spacing ≥ 2 r					
Lane:	s Divided Undivided	A 2,000	B 7,000	C 12.200	D	E 27.000	T			vel of Servi		-	1
4	Divided	20,400	33,000	13,800 47,800	19,600 61,800	27,000 70,200	Lanes 4	A 23,800	B 39,600	C 55,200	D 67,100	E 74,600	
6	Divided	30,500	49,500	71,600	92,700	105,400	6	36,900	61,100	85,300	103,600	115,300	1
<del></del>				ARTERIA		100,100	8	49,900	82,700	•			ŀ
Class	; I (>0,00 to 1						10	63,000	104,200	115,300 145,500	140,200 176,900	156,000 196,400	
3,	, , (			evel of Serv			12	75,900	125,800	175,500	213,500	237,100	
Lane	s Divided	A	В	C	D	E		,,,,,,,	120,000	175,500	115,500	137,100	ļ
2	Undivided	**	4,200	13,800	16,400	16,900	Interchang	e spacing < 2 r	mi, apart				
4	Divided	4,800	29,300	34,700	35,700	***				vel of Servi	ce		- 1
6	Divided	7,300	44,700	52,100	53,500	***	Lanes	A	В	С	D	臣	
8	Divided	9,400	58,000	65,100	67,800	***	4	22,000	36,000	52,000	67,200	76,500	
Пага	s II (2.00 to 4.	50 signali	ized interse	ections nec	mîle)		6 8	34,800 47,500	56,500 77,000	81,700 111,400	105,800 144,300	120,200 163,900	
Chis	11 (2,00 10 4)	oo argama		evel of Ser			10	60,200	97,500	141,200	182,600	207,600	
Lane	s Divided	A	В	С	D	В	12	72,900	118,100	170,900	221,100	251,200	1
2	Undivided	**	1,900	11,200	15,400	16,300				,			•
4	Divided	**	4,100	26,000	32,700	34,500							
6	Divided	**	6,500	40,300	49,200	51,800			BIC	YCLE MO	DDE		
8	Divided	**	8, <i>5</i> 00	53,300	63,800	67,000		rel of service f					
	- YYY / 4k	4 6 -1						at 40 mph po					
Liass	s III (more tha			usiness dist		1 not	of dispersion	acility.) (Mult nal roadway la	ipiy motonz	ed vanicle	volumes sho	own below by	number
1			er 750,000)		TICL OF AIT		Of mischo	Hai I Dauway 1a	TTES 10 DETET	mme two-v	ау шахини	III Sei vice vai	umes.)
l			<b>,</b> ,	•			Paved	Shoulder/					
			L	evel of Sen	rice		Bicy	ale Lane			Level of Sea	rvice	1
	s Divided	A	В	С	D	E		verage	A	В	С	D	E
2	Undivided	**	**	5,300	12,600	15,500		49%	**	**	3,200	13,800	>13,800
4 6	Divided	**	**	12,400	28,900	32,800		-84%	**	2,500	4,100	>4,100 ***	***
8	Divided Divided	**	**	19,500 25,800	44,700 58,700	49,300 63,800	85-	100%	3,100	7,200	>7,200	***	***
ľ	211111111			25,600	20,700	D21000			PEDE	STRIAN I	MODE		
Class	s IV (more the	an 4.5 sign	nalized into	ersections r	्दा क्योंट का	d within	(Note: Le	vel of service i	for the pede	strian mode	in this table	e is based on a	coadway
			al business	district of	an urbaniz	ed area	geometric	s at 40 mph po	sted speed a	od traffic c	onditions, n	ot number of	pedestrians
1	ov <del>er</del> 750	),000)	_		-		using the	facility.) (Mult	iply motoriz	zed vehicle	volumes sh	own below by	number of
ł.			L	evel of Ser C	vice D	E	directiona	l roadway lane	s to determ				nes.)
ĭ and	se Dárádad	Δ	n		<i>D</i>	15					Level of Se	D	E
	es Divided Undivided	A **	B **		13 700	13 000	Sidewal	k Coverage	Δ	R		6,400	3.0
Lane 2 4	es Divided Undivided Divided		_	5,200	13,700 30,300	15,000 31,700		k Coverage 49%	A **	B **	C **		15.500
2	Undivided	**	**		13,700 30,300 45,800	15,000 31,700 47,600	0				_	9,900	15,500 19,000
2 4	Undivided Divided	** **	**	5,200 12,300	30,300	31,700	0 50	49%	**	**	**	9,900 >11,300	-
2 4 6	Undivided Divided Divided	** ** **	** ** **	5,200 12,300 19,100 25,900	30,300 45,800 59,900	31,700 47,600	0 50	-49% )-84%	**	**	**	•	19,000
2 4 6	Undivided Divided Divided	** ** ** NON-S	** ** ** **	5,200 12,300 19,100 25,900 ADWAYS	30,300 45,800 59,900	31,700 47,600	0 50	49% )-84% -100%	** ** ** BUS MODE	** ** 2,200	** ** 11,300 1Fixed Rou	>11,300	19,000
2 4 6	Undivided Divided Divided	** ** ** NON-S: Major (	** ** ** **  FATE RO	5,200 12,300 19,100 25,900 ADWAYS y Roadway	30,300 45,800 59,900	31,700 47,600	0 50 85	49% )-84% -100% E	** ** SUS MODE	2,200 (Schedule:	**  **  11,300  1 Fixed Rought	>11,300 ite)	19,000 ***
2 4 6 8	Undivided Divided Divided Divided	**  **  NON-S  Major (	** ** ** **	5,200 12,300 19,100 25,900 ADWAYS y Roadway	30,300 45,800 59,900	31,700 47,600 62,200	0 50 85	49% )-84% -100%	** ** SUS MODE	2,200 (Schedule:	**  11,300  1 Fixed Rouseur)  single direction	>11,300 ite) in of the higher tre	19,000 ***
2 4 6 8	Undivided Divided Divided	**  **  NON-S' Major (	**  **  **  FATE RO City/County Level of Se	5,200 12,300 19,100 25,900 ADWAYS y Roadway	30,300 45,800 59,900	31,700 47,600 62,200 E	0 50 85 (Note: Buses	49% )-84% -100% Per hour shown en	** ** SUS MODE	** 2,200 CSchedule Uses per hour in the	11,300  1 Fixed Rought  in Fixed Rought  Level of Se	>11,300 ite) in of the higher tre	19,000 ***
2 4 6 8	Undivided Divided Divided Divided Divided  Solvided Divided Undivided Divided	**  **  NON-S' Major (	**  **  **  FATE RO  Lity/County  Level of Se  B	5,200 12,300 19,100 25,900 ADWAYS y Roadway avice C 9,100 21,400	30,300 45,800 59,900	31,700 47,600 62,200	0 55 85 (Note: Buses Sidewai	49% 0-84% -100% F per hour shown in 0k Coverage -84%	**  **  SUS MODE  (Fe maly for the per  A	2,200 (Schedule:	**  11,300  1 Fixed Rouseur)  single direction	>11,300  ite) in of the higher tre	19,000 ***
2 4 6 8 Lane 2	Undivided Divided Divided Divided Divided Divided  Solvided Undivided	NON-S: Major (	FATE RO City/County Level of Se B	5,200 12,300 19,100 25,900 ADWAYS y Roadway avice C 9,100	30,300 45,800 59,900 S S	31,700 47,600 62,200 E 15,600	0 55 85 (Note: Buses Sidewai	49% 0-84% -100%  For hour shown and	**  **  BUS MODE  (F)  c maly for the pr	2,200  (Schedule: Suses per home in the	** 11,300 1 Fixed Rouper) single direction Level of Se	>11,300  ite) in of the higher tre cryice D	19,000 *** dic flow.) E
2 4 6 8 Lane 2	Undivided Divided Divided Divided Divided  Solvided Divided Undivided Divided	NON-S: Major (	***  **  FATE RO City/County Level of Se  B  **	5,200 12,300 19,100 25,900 ADWAYS y Roadway avice C 9,100 21,400	30,300 45,800 59,900 3 5 14,600 31,100	31,700 47,600 62,200 E 15,600 32,900	0 55 85 (Note: Buses Sidewa) 0	49% 0-84% -100%  For how shown and 1k Coverage -84% 100%	**  **  BUS MODE  (E c maly for the pr  A  **  >6	2,200 Cochedule: Suses per host bour in the B >5 >4	11,300  1 Fixed Rought) single direction Level of Se C 24 ≥3	>11,300  ite) in of the higher tre cryice D ≥3	19,000 *** dffic flow.)  E ≥2 ≥1
2 4 6 8 Lane 2	Undivided Divided Divided Divided Divided  Solvided Divided Undivided Divided	NON-S: Major O  A  **  **  Other	***  **  **  FATE RO City/County Level of Se  B  **  **  Signalized	5,200 12,300 19,100 25,900 ADWAYS y Roadway avice C 9,100 21,400 33,400	30,300 45,800 59,900 59,900 0 14,600 31,100 46,800	31,700 47,600 62,200 E 15,600 32,900	0 55 85 (Note: Buses Sidewa) 0	49% 0-84% -100%  Per hour shown and 1k Coverage -84% 100%  ARTERIAL	SUS MODE  E maly for the pu  A  **  >6  L/NON-STA	2,200  (Schedule: Buses per heak bour in the	11,300 d Fixed Rought fixed Rou	>11,300  itb)  in of the higher to stryice  D ≥3 ≥2  JUSTMENT	19,000 *** dffic flow.)  E ≥2 ≥1
2 4 6 8 Lane 2	Undivided Divided Divided Divided Divided  Solvided Divided Undivided Divided	NON-S: Major (  A  **  Other (signalize	FATE RO City/County Level of Se B ++ +* Signalized and intersec	5,200 12,300 19,100 25,900  ADWAYS y Roadway Tvice C 9,100 21,400 33,400  Roadways tion analys	30,300 45,800 59,900 59,900 0 14,600 31,100 46,800	31,700 47,600 62,200 E 15,600 32,900	0 50 85 (Note: Buses Sidewa) 0 85-	49% 0-84% -100%  For hour shown in the Coverage -84% 100%  ARTERIAL (alter co	SUS MODE (E) c mly for the po  A ++ >6  L/NON-STA  DIVII presponding	2,200 (Scheduler Suses per healt bour in the B >5 >4  ATE ROAL OHD/UNDI volume by	11,300 d Fixed Rought direction Level of Se C C 24 ≥3 DWAY AD. VIDED the indicate	>11,300  atte)  on of the higher tre  tryice  D  ≥3  ≥2  JUSTMENT  ed percent)	19,000 **** ffic flow.) E ≥2 ≥1
2 4 6 8 Lane 2 4 6	Undivided Divided Divided Divided Divided  S Divided Undivided Divided Divided	NON-S' Major ( I A **  **  Officer (signalize	FATE RO Lity/County Level of Se B ** **  Signalized ed intersec Level of Se	5,200 12,300 19,100 25,900 ADWAYS y Roadway tvice C 9,100 21,400 33,400 Roadways tion analys	30,300 45,800 59,900 B 14,600 31,100 46,800	31,700 47,600 62,200 E 15,600 32,900 49,300	0 50 85 Note: Bases Sidewal 0 85-	49% 0-84% -100%  For hour shown and the Coverage -84% 100%  ARTERIAL (alter co- Median	BUS MODE (Fe mily for the pr  A  **  >6  L/NON-STA  DIVII  rresponding  Left To	2,200  (Schedule: buses per head hour in the  B  >5  >4  ATE ROAI  DED/UNDI  volume by uns Lanes	11,300 d Fixed Rought direction Level of Se C C 24 ≥3 DWAY AD. VIDED the indicate	>11,300  atte)  on of the higher tre  rivice  D  ≥3  ≥2  JUSTMENT  ed percent)  Adjustment Fa	19,000 **** ffic flow.) E ≥2 ≥1
2 4 6 8 Lane 2 4 6	Undivided Divided Divided Divided Divided  Solvided Undivided Divided Divided Divided Divided Divided	NON-S: Major ( I A **  Other (signaliz)	FATE RO City/County Level of Se B ++ +* Signalized and intersec	5,200 12,300 19,100 25,900 ADWAYS y Roadway tvice C 9,100 21,400 33,400 Roadways tion analys	30,300 45,800 59,900 B 14,600 31,100 46,800	31,700 47,600 62,200 E 15,600 32,900 49,300	0 50 85  (Note: Buses Sidewal 0 85-  Lanes 2	49% 0-84% -100%  For hour shown in the Coverage -84% 100%  ARTERIAL (alter co Median Divided	BUS MODE (Fe cally for the property of the pro	2,200 C(Scheduler buses per hear hour in the lar hour in lar hour la hour	11,300 d Fixed Rought direction Level of Se C C 24 ≥3 DWAY AD. VIDED the indicate	>11,300  and of the higher tree revice  D  ≥3  ≥2  JUSTMENT  ed percent)  Adjustment F: +5%	19,000 **** ffic flow.) E ≥2 ≥1
2 4 6 8 Lane 2 4 6	Undivided Divided Divided Divided  Solvided Undivided Divided Divided Divided Divided Divided Undivided Divided Divided	NON-S: Major ( I A **  Other (signaliz)	FATE RO Sity/County Level of Se B **  **  Signalized ed intersec Level of Se	5,200 12,300 19,100 25,900 ADWAYS Y Roadways avice C 9,100 21,400 33,400 Roadways stion analys ervice C 4,800	30,300 45,800 59,900 14,600 31,100 46,800 5,555 D	31,700 47,600 62,200 E 15,600 32,900 49,300 B 12,600	O 50 85 (Note: Buses Sidewal 0 85- Lanes 2	49% 0-84% -100%  Per hour shown and lk Coverage -84% -100%  ARTERIAL  (alter co Median Divided Undivided	BUS MODE (E c mly for the per A ++ >6  //NON-ST/ DIVII rresponding Left To	2,200  Genedule: Buses per head bour in the  Buses Per head bour in the  ATE ROAJ	11,300 d Fixed Rought direction Level of Se C C 24 ≥3 DWAY AD. VIDED the indicate	>11,300  and the higher trace to be service.  D  ≥3  ≥2  JUSTMENT  and percent)  Adjustment F2  +5%  -20%	19,000 **** ffic flow.) E ≥2 ≥1
2 4 6 8 Lane 2 4 6	Undivided Divided Divided Divided  Es Divided Undivided Divided Divided Divided Divided Divided Undivided Divided	NON-S' Major ( I A **  **  Other (signaliz A **  **	FATE RO City/County Level of Se B **  **  Signalized ed intersec Level of Se B **  **	5,200 12,300 19,100 25,900 ADWAYS y Roadway tvice C 9,100 21,400 33,400 Roadways stion analys service C 4,800 11,100	30,300 45,800 59,900 14,600 31,100 46,800 isis) D 10,000 21,700	31,700 47,600 62,200 E 15,600 32,900 49,300 B 12,600 25,200	(Note: Buses Sidewal 0 85-  Lanes 2 Multi	49% 0-84% -100%  For how shows so lk Coverage -84% 100%  ARTERIAL  (alter co Median Divided Undivided Undivided	BUS MODE (Figure 1)  A  A  S  NON-STA DIVII  Tresponding Left To	2,200  Genedule: Buses per healthour in the  B >5  ATE ROAL  DED/UNDI  TOURNED  TOUR	11,300 d Fixed Rought direction Level of Se C C 24 ≥3 DWAY AD. VIDED the indicate	>11,300  and the higher trace to be service.  D ≥3 ≥2  JUSTMENT  and percent)  Adjustment F2 +5% -20% -5%	19,000 ****  ffic flow.)  E ≥2 ≥1
2 4 6 8 Lane 2 4 6	Undivided Divided Divided Divided  Solvided Undivided Divided Divided Undivided Divided Undivided Divided Undivided Tree: Florio	NON-S' Major ( I A **  **  Other (signaliz A **  A  **  da Depart	FATE RO City/County Level of Se B ** ** Signalized ed intersec Level of Se B ** ment of Tr	5,200 12,300 19,100 25,900 ADWAYS Y Roadways avice C 9,100 21,400 33,400 Roadways stion analys ervice C 4,800	30,300 45,800 59,900 14,600 31,100 46,800 isis) D 10,000 21,700	31,700 47,600 62,200 E 15,600 32,900 49,300 B 12,600	O 50 85 (Note: Buses Sidewal 0 85- Lanes 2	49% 0-84% -100%  Per hour shown and lk Coverage -84% 100%  ARTERIAL  (alter co Median Divided Undivided	BUS MODE (Figure 1)  A  A  S  NON-STA DIVII  Tresponding Left To	2,200  Genedule: Buses per head bour in the  Buses Per head bour in the  ATE ROAJ	11,300 d Fixed Rought direction Level of Se C C 24 ≥3 DWAY AD. VIDED the indicate	>11,300  and the higher trace to be service.  D  ≥3  ≥2  JUSTMENT  and percent)  Adjustment F2  +5%  -20%	19,000 **** ffic flow.) E ≥2 ≥1
2 4 6 8 Lane 2 4 6	Undivided Divided Divided Divided  Solvided Undivided Divided Divided Undivided Divided Divided Undivided Divided Undivided Undivided Divided Tree: Flori Syste	NON-S' Najor ( I A **  **  Other (signaliz) A **  **  A **  A **  A **  **  **  A **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **  **	FATE RO City/County Level of Se B ** **  Signalized ed intersec Level of Se B **  ment of Tr ing Office	5,200 12,300 19,100 25,900  ADWAYS y Roadways  Tvice C 9,100 21,400 33,400  Roadways  tion analys  arvice C 4,800 11,100  ansportatio	30,300 45,800 59,900 14,600 31,100 46,800 isis) D 10,000 21,700	31,700 47,600 62,200 E 15,600 32,900 49,300 B 12,600 25,200	(Note: Buses Sidewal 0 85-  Lanes 2 Multi	49% 0-84% -100%  For how shows so lk Coverage -84% 100%  ARTERIAL  (alter co Median Divided Undivided Undivided	BUS MODE  (E  mly for the per  A  ++  >6  //NON-ST/ DIVII  mesponding  Left To	2,200  Georgia Control	11,300 d Fixed Roughly single direction Level of Se C 24 23 DWAY AD: VIDED the indicate	>11,300  and the higher trace to be service.  D ≥3 ≥2  JUSTMENT  and percent)  Adjustment F2 +5% -20% -5%	19,000 **** ffic flow.) E ≥2 ≥1
2 4 6 8 Lane 2 4 6	Undivided Divided Divided Divided  System  System  System  605 S	NON-ST Major (  A  **  Other (signaliz  A  **  A  Suwannee	FATE RO City/County Level of Se B ** **  Signalized red intersect Level of Se B **  ment of Tr ing Office Street, MS	5,200 12,300 19,100 25,900  ADWAYS Y Roadways Tvice C 9,100 21,400 33,400  Roadways tion analys ervice C 4,800 11,100 ansportatio	30,300 45,800 59,900 14,600 31,100 46,800 isis) D 10,000 21,700	31,700 47,600 62,200 E 15,600 32,900 49,300 B 12,600 25,200	(Note: Bases Sidewal 0 85-  Lanes 2 2 Multi Multi	49% 1-84% 1-100%  Per hour shown and the Coverage 84% 100%  ARTERIAL (alter condedian Divided Undivided Un	BUS MODE  (E)  c)  c)  c)  A  **  >6  L/NON-STA  DIVII  mesponding  Left To	2,200  (Schedule: Suses per healthour in the  B >5 >4  ATE ROAD DED/UNDI Volume by volume by fes No Yes No WAY FAC	11,300 I Fixed Rought of Section 1. Section	>11,300  and the higher trace of the higher t	19,000 ****  ###  ###  ###  ###  ###  ###
Lane 2 4 6 Lane 2 4 5 Sour	Undivided Divided Divided Divided Divided Undivided Divided Divided Divided Divided Continued Divided Divided Divided Tree: Flori Syste 605 S Talla	NON-S' Major ( I A **  Other (signaliz A **  Non-S' Major ( I A *  Non-S'	FATE RO City/County Level of Se B ++ +* Signalized red intersec Level of Se B ++ +* ment of Tr ing Office Street, MS L 32399-0	5,200 12,300 19,100 25,900  ADWAYS y Roadway  Tvice C 9,100 21,400 33,400  Roadways  tion analys  ervice C 4,800 11,100 ansportation 3 19 450	30,300 45,800 59,900 14,600 31,100 46,800 5,55 D 10,000 21,700	31,700 47,600 62,200 E 15,600 32,900 49,300 B 12,600 25,200 02/22/02	(Note: Bases Sidewal 0 85-  Lanes 2 2 Multi Multi	49% 1-84% 1-100%  Proper hour shown and the Coverage 84% 100%  ARTERIAL (alter condedian Divided Undivided	BUS MODE  (E)  c)  c)  c)  c)  c)  c)  c)  c)  c)	2,200  (Schedule: Buses per healt hour in the  State ROAI DED/UNDI Volume by volume by volume by Yes No Yes No WAY FAC	11,300 I Fixed Rough on the single direction of Se C >4 >3  DWAY AD VIDED the indicate of the indicate of the single direction	>11,300  and the higher the service  D ≥3 ≥2  JUSTMENT  ed percent) Adjustment Fa +5% -20% -25%  this table by 4	19,000 ****  ###  ###  ###  ###  ###  ###
Lane 2 4 6 South	Undivided Divided Divided Divided  System  Sys	NON-ST Major ( I A **  Other (signaliz)  A **  A **  A  part of the part of th	FATE RO City/County Level of Se B ** **  Signalized red intersec Level of Se B **  ment of Tr ing Office Street, MS L 32399-0- com/planni	5,200 12,300 19,100 25,900  ADWAYS Y Roadways Tvice C 9,100 21,400 33,400  Roadways tion analys service C 4,800 11,100 ansportatio s 19 450 ing/systems	30,300 45,800 59,900 31,600 31,100 46,800 5,515) D 10,000 21,700	31,700 47,600 62,200 E 15,600 32,900 49,300 B 12,600 25,200 02/22/02	(Note: Bases Sidewal 0 85-  Lanes 2 2 Multi Multi	49% 1-84% 1-100%  Per hour shown and the Coverage 84% 100%  ARTERIAL (alter condedian Divided Undivided Un	BUS MODE  (E maly for the property of the prop	2,200  (Schedule: Susce per healthour in the  B >5 >4  ATE ROAD DED/UND) Volume by vol	11,300 I Fixed Rough out) single direction C	>11,300  and the higher transfer to the higher transfer transfe	19,000 ****  ffic flow.)  E ≥2 ≥1  S actors

This table and submitted is submitted at least only for general paramy applications. The computer models is about the state of my fact operating paramy applications. The table and driving computer models should not be used for contributed or interaction design, where more retired techniques exists. Values shown are two-way secured worms applications. The table and sixty of service of service and are for the summobile-brack modes unless specifically stated. Level of service letting goods thresholds are probably not comparable across modes and, therefore, cross model comparisons should be made with caution. Furthermore, combining levels of service of different modes into one overall readway level of service is not recommended. The table's imput value defaults and level of service criteria supear on the fullowing page. Calculations are based on planning applications of the Highway Capacity Mesmal, Bicycle LOS Model, Pedestrian LOS Model and Transit Capacity and Quality of Service Massaul, respectively for the automobile-brack by the summobile and the summobile

TABLE 4 - 1 (continued)
GENERALIZED ANNUAL AVERAGE DAILY VOLUMES FOR FLORIDA'S **Urbanized Areas** 

# INPUT VALUE ASSUMPTIONS

		UNINTERRUPTED FLOW FACILITIES	LOWIACLITES		Г
	Elebraia	ı		Highways	
POADWAYCHARACATRRISTICS	Cteat III	Clerk IV			
Number of through lanes	4-12	4 - 12	2	4.6	
Posted most (mpl)	59	55	50	S)	
Franchise Arrest (Tarali)	2.0	69	55	55	ì
Basic seconds long(h (nd))	1.5	0			_
Interplace special por mile	2.5	1			
Median (n.v)			п	ý	ļ
1 of lum lands (4.y)			'n	y	
Terrain (r.!)	1			~	1
96 no nearing zona			80		ī
Pasaing fanes (n.y)			II II		-1
TRAITIC CHARACTERISTICS					1
Planning analysis from factor (K)	260'0	0.093	0.095	0.095	-T
Directional distribution factor (D)	0.55	0.55	0.55	0.35	7
Peak hour factor (PHF)	0.95	6,95	0.925	0.925	7
Date appoint (market)			1700	2100	
Henry velicial netted	6.0	4,0	2.0	2.0	7
Torsi ndisembal factor	86.0	00.1	1.0	1,0	7

							i			REDITED	INTERRUPTED FLOW FACILITIES							
						State	State Arterials							Non-State Rondways	Rondmays	Dicycle	redestrian	Bus
	-	,	[	Į	L sel			Clean III			Claurity		Major Cl	Major Clty/County	Other Stgmilland	Class II	Class	
ROADWAY CHARACIBERIUS	ļ						-	4.6	-	2	4-6		7	4-6	2-4	4	4	
Number of through Janea	72	÷-		-4	2,7		, ,		32	ş	0.0	F	45	45		3	40	
Pusted speed (mpli)	45	20	8	Ş	4	4	5			2 4	,		2 8			45	45	
Free flow apped (mph)	20	55	55	ğ	8	20	₽	6	2	3	î	3	2	3		١,	,	
Medley bone (n nr r)	Z	*		п		¥	п	ı	н	Ħ	in.	ī	4	4				
77-17-17-17-17-17-17-17-17-17-17-17-17-1	þ	,	Þ	,	>	Y	>	۸	'n	λ	y	ř	у	Y	Y	7	7	
Lolf furn lands (ft.)?	†		1													n,50%,y	п	
Payod shoulder@daysle lage (a.y)								1				Ī				_	~	
Outside Tage width (n,t,w)							1	1		Ì	Ī	Ī						
Pavement pondition (u,t,d)								1									2.50%,7	ਰਿ
Stowalk (n.y)							1	1	ļ			Ī						
Sidowalkirosciway separation (a.t.w)							1	1				Ī					f	
Skiewalk/medway protective barrier (n.v)																		e
Obstoch to has size (1.V)					}	Ì										T		
ATTENDED OF A THE ACTION OF TH	ļ													1	1000	2000	2500	
THE PERSON NAMED AND ADDRESS OF THE PERSON NAMED AND ADDRESS O	2000	1 1005	5000	5008	0.095	0.005	0.095	260'0	0.095	0.095	0.095	0.005	0,095	0.093	660,0	cento	2000	
Panang analysis nour lactor (E.)	Centra		ž		2.0	25.0	25.0	55.0	0.55	0.55	0.55	0.55	0.55	0.55	0.53	0.55	0.55	
Directional distribution factor (D)	3				200	2000	0.075	0000	0.025	0.925	0.925	0,925	0.925	0.925	0,925	0.925	0.925	
Peak hour factor (PHF)	526.0	0.925	0.925	675	1260	27.00	74.5	300	1907	CADI	CODI	906	1900	0062	1909	19040	0061	
Dass asturation flow rate (pophyl)	1900	500	906	0001	DOG!	Onk!	3		2		-		:	1.5	1.0	2.0	2.0	
Heavy vehicle percent	2.0	5.0	7.0	2.0	2	77			101	2 6	6	8	98	86.0	0.95	0.98	96:0	
Local adjustment factor	1.0	97	3		P.	623	2		2	2	2	2	4	7	10	12	12	
% turns from exclusive turn lanes	12	12	13	2	12	71	2	2	77	,								15
Bus span of sorvice							1	1				Ī						
CONTROL CHARACTERISTICS						4	1	١	9	2 2	200	2	r,	3.0		3.0	3.0	
Signalizad interaccions per mile	-	2	=	2	-	?;	,	3		200	4	4	4	7	F	•	4	
Aurival type (1-6)	m	3	m	4	4	÷	+	,		,	,	Ţ			9		50	
Signal type (a,4,f)	4	#		-	•			-	•		12.	-	000	130	170	130	120	
Cyale leagth (C)	120	120	120	23	220	202	R2	2	077	3	77	200	120	190	16.0	250	0.44	
Hective greet ratio (g/C)	0.44	0.41	9.4	0.44	0.44	4.0	4.4	D.44	#	4.4	\$		2	100				

# LEVEL OF SERVICE THRESHOLDS

ing in		_	Hunestan hr	<u>'l</u> T	35	7.4			5 2 3	1 A 1	5 5 5	V V V V	V V V	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$
rete reduction	1		1000		ئ ا	200			<3.5	5 <3.5	9.5 < 3.5	5 < 3.5		26.25.25.25.25.25.25.25.25.25.25.25.25.25.
licacie	Į	zec	_	DICOJE AND	₹	1			<u> </u>					
Ning-State Bossbanza	ĺ	Differ Signature	_	_	< 10 pec				< 35 8ec	< 35 Bec	< 35 Bec	< 35 Rec < 55 Rec	< 35 Rev < 55 Rev < 80 ges	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5
Sept. Cirk	THE MONT	Major City/Onnity	Carried State	ALS	V35 molt		-	7.00	- FEE 12 A	> 23 mpli	> 23 mpl	> 23 mpli > 17 mpli	> 23 mpli	> 23 mpli
		Charl TV		ATS	> 25 mmb			HI HIGHT CT		V 13 mph	13 mm	> 13 mmla > 9 mml	1 mm   1 mm	13 mpl / 13 mpl / 14
Tree Carlo	INIBILE TWO-WILL GLICHAIN	E ::0		ATS	> 30 purh	20.00		107211	10 37	> 18 mpb	V 18 mpb	> 18 mph	V 14 mph	V 16 mph
	Olale 170		3	Y Y	1 200			FOE STA		~ 22 回 · ·	10000000000000000000000000000000000000		2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 / 2 /	7 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
-		,		AT8		7 47 mbur		V 14 mol	> 34 mph	> 34 mph	> 34 mpt	> 34 mpt	V 22 mpt	> 34 mot. > 21 mpt. > 23 mpt. > 16 mpt.
	lateral vol		Mulium	Themselv	t	0.29		X1.7	ľ	147 < 18				<u>*</u>  *  *  *  *  *  *  *  *  *  *  *  *  *
	Hieles		(wo-Lane	37 AES	20110	> 0.917 < 0.				Y				
			_						812	## % X	20 EX	\$ 52 %	2 2 2 S	\$ 25 SE S
		Freemays			۸/د	000		7	140.47	79.0	× 0.68	10.04	0.68 0.68	2000 2000 2000 2000 2000 2000 2000 200
	,	TY T	Class III		n Denity		,		53 5 18	53 <18	53 < 18	55 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	55 × 18 174 × 286 1990 × 335	2 2 2 3
			Terral of		Service	٧ ۲		1	D Z	e e	D O	ф 0 0 0	6 0 0 0 0 0	6 0 0 E

### **TABLE 4 - 2**

### GENERALIZED ANNUAL AVERAGE DAILY VOLUMES FOR FLORIDA'S **AREAS TRANSITIONING INTO URBANIZED AREAS OR** AREAS OVER 5,000 NOT IN URBANIZED AREAS*

	UNI	NTERRUP	TED FI.O	W ELIGERA	AYS			· 1	TEEWAY	S		<del>-</del>
Lane 2 4 6	s Divided Undivided Divided Divided	A 2,100 18,600 27,900	Le B 6,900 30,200 45,200	rvel of Servi C 12,900 43,600 65,500	D 18,200 56,500 84,700	E 24,900 64,200 96,200	Lanes 4 6 8	A 23,500 36,400 49,100 61,800	B 38,700 59,800 80,900 101,800	evel of Servi C 52,500 81,100 109,500 138,400	D 62,200 96,000 129,800 163,800	E 69,100 106,700 144,400 182,000
Class	) 1.9 s 1 (>0.00 to	STATE TW 9 signalized						BIC	CYCLE MO	ODE		<del></del>
Lane 2 4 6	s Divided Undivided Divided Divided	A ** 4,600 6,900	Le B 4,000 27,900 42,800	evel of Serve C 13,100 32,800 49,300	D 15,500 34,200 51,400	E 16,300 *** ***	(Note: Level of sa geometrics at 40 r bricyclists using th below by number maximum service	uph posted spec e facility.) (Mu of directional re	ed and traffi ltiply motor	e conditions ized vehicle	not numbe Volumes sh	rof own
	s II (2,00 to 4,50 es Divided Undivided Divided Divided	A ** ** **		es per mile)  Evel of Serv  C  10,500  24,400  38,000	ice D 14,500 30,600 45,100	E 15,300 32,200 48,400	Paved Shoulder Bicycle Lane Coverage 0-49% 50-84% 85-100%	A ** ** 3,200	B 1,900 2,500 7,100	evel of Serv C 3,300 4,000 >7,100	D 13,600 >4,000	E >13,600 *** ***
	s III (more than	4.5 cionalia	•	•	•	40,400	•	PEDÎ	ESTRIAN I	MODE		
	es Divided Undivided Divided Divided	A ** **		zvel of Serv. C 5,000 11,700 18,400		E 14,600 30,800 46,300	(Note: Level of se roadway geometri of pedestrians usi by number of dire service volumes.)	ic at 40 mph poing the facility.) actional roadway	sted speed a (Multiply r	and traffic co notorized ve	mditions, no bicle volum	t number es shown
		· · · · · · · · · · · · · · · · · · ·		18,400	42,100	·	% Sidswalk Cover	age A	В	Level of Serr C	rics D	E
			ATEROA ity/County I				0-49% 50-84% 85-100%	** **	** ** 2,200	** ** 11,200	6,300 9,800 >11,200	15,400 18,800 ***
2 4	es Divided Undivided Divided	A **	** **	evel of Serv C 7,000 16,400	D 13,600 29,300	E 14,600 30,900	į Į		DED/UND	IVIDED	USTMEN	rs
6	Divided		** ignalized R d intersection	25,700 (oadways on analysis)	44,100	46,400	Lanes 2 2	Median Divided Undivided	Left	Tum Lanes Yes No	- 4	ent Factor -5% 20%
Γ	es Divided			evel of Serv	_	>4	Multi Multi	Undivided Undivided		Yes No		-5% 25%
1.and 2 4	Undivided Divided	A ** **	B **	C 4,400 10,300	D 9,400 20,200	E 12,000 24,000	ļ	ONE	-WAY FAC	HITTES		
Som	rce: http://www.II.	Systems 605 Suw Tallahasi	Planning O annee Stree see, FL 323	t, MS 19 99-0450	tation	02/22/02		responding two equivalent one				

This table does not constitute a standard and should be used only for general planning applications. The table and deriving computer models should be used for corridor or intersection design, where more infined techniques exist. Values shown are two-way annual evenage daily variances (based on K, 20 factors) for levels of service and are for the amountable/brack modes unless specifically stated, level of service letter guide thresholds are probably and companies among modes and, therefore, most model companies should be noted on the companies among smodes and, therefore, most model companies should be noted on planning specifically stated, level of service better guide thresholds are probably and companies among smodes and, therefore, most model companies should be most on the following page. Calculations, excellently service of different modes into one overall madway level of service is not recommended. The table's imput value defaults and level of service divides and pedestrian modes.

***Not applicable for the level of service letter guide. For antomobile/track modes, volumes greater than level of service D because intersection expectives have been reached. For they are the podestrian modes, the level of service letter guide (including F) is not achievable, because finer is no maximum vehicle volume fireshold using table input value defaults.

्यु

Ī

# TABLE 4 - 2 (continued) GENERALIZED ANNUAL AVERAGE DAILY VOLUMES FOR FLORIDA'S AREAS TRANSITIONING INTO URBANIZED AREAS OR AREAS OVER 5,000 NOT IN URBANIZED AREAS

# INPUT VALUE ASSUMPTIONS

			4.6	50	3.5			,						D.DQ.C	0.55	R.910	2100	4.0	0.05
STOW FACILITIES	Historya	*												190					
UNINTERRUPTED FLOW FACILITIES			[7	35	56				>	1	09			9600	0.5	0.910	1780	0.4	980
	Freemys	Clean	4-10	70	25	£	4			_				0,100	0.55	0.95		0.6	0.95
		ROADWAY CHARACATERISTICS	Number of through Janes	Posted speed (mph)	Fine tlow speed (ingli)	Resto segment longth (ml)	Intercliange speeding per mile	Medipa (a,y)	Loft term lanes (n.y.)	Terrain (r,1)	% no passing	Fascing lance (n,y)	TRAFFIC CHARACTERISTICS	Planning analysis hour factor (K.)	Directional distribution factor (D)	Peak how fautor (PEIF)	Haso capacity (pepipt)	Heavy veidule purpent	Local adjustment factor

					INTER	INTERRUPTED PLOW FACILITIES	FACILITIES	The state of the s		-	
			State /	State Arterials				Non-Stafe Readways	İwaya	Blevele	Pedestrian
KOADWAY CHARACTERISTICS	-	Class I	Cla	Class II	5	Clary III	Major C	Major Clty/County	Other Strastized	Clara	Care
Number of through Janes	2	4-6	. 2	9-4	2	4-6	2	9	2-4	4	P
Posted speed (mph)	45	20	45	45	35	35	\$	\$		GP C	up
Free flow apond (uph)	20	55	30	20	4	40	45	45		£	¥ .
Modian type (a,ar,t)	д	<b>1</b>		1	٩	1	=			7.	<b>?</b>
Left turn lances (n,y)	^	,	*	^	,	-	Þ	,		,	1
Payed shoulder/bioyole lane (u,y)								-		. coo	,
Outside land width (n,f,w)										4.77.67	=
Pavement coedition (u,t,d)										-	
Sidewalk (n,y)											2 S/102. ve
Sidows)kimedway separation (a, t n)											4507.03
Sidewalk/nedway protective bacrier (n.y.)				-							
TRAFFIC CHARACTERISTICS											7
Planning analysis hour factor (K)	960.0	0.096	960'0	0.096	960.0	9600	0.096	0.096	9000	9000	9000
Divoctional distribution factor (D)	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	25.0	95.0	0.55
Peak hour factor (PHI)	0160	0.910	0,910	0.910	0160	0160	0.910	0.910	0.910	0.910	0.910
Base salvisting flow rate (pophpf)	1900	0061	1900	1900	1900	1900	1900	1900	1900	0061	1909
Houvy volicie parcent	3.0	3.0	3.0	3,0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Local adjustment factor	0.98	0.98	0.95	0.95	0.92	0.92	0.95	0.95	0.92	0.95	0.95
% tums from exclusive turn leases	13	12	12	12	12	12	14	2	91	1.2	()
CONTROL CHARACTERISTICS						,					!
Signatized informactions per mile	1.5	0.1	3.0	3.0	5.0	5.0	3.0	3.0		3.0	3.0
Artival type (3-6)		3	4	•	4	4	4	4		4	4
Signal type (4, s, f)	5	ĸ	9	9	Э	9	9	9	8		
Cycle longth (C)	120	120	120	120	120	120	120	120	120	120	071
Uffoutive green ratio (g/C)	0,44	0.44	0.44	40	0.44	0,44	14.0	0,41	0.31	40.0	0.44
-											]

# LEVEL OF SERVICE THRESHOLDS

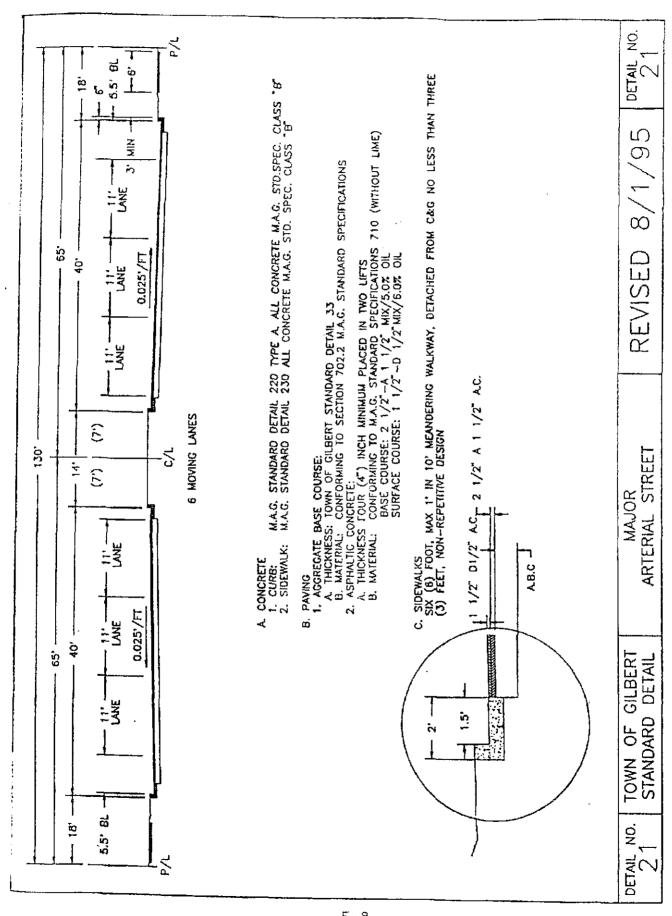
	Dren	787		Digitmuya	i	SAME	State Tro-Way Arterial	183	Non-State	Non-State Roadmays	Dieyele	Pedertrian
Leyeles	100	111	Two-Lane	Muh	Autilian	Class I	Clene II	Cless	Major City/County	Ī		
Service	0/4	Density	% TTS	۸/۵	Donatty	ATS	ATS	ATS	ATS	i	Store	Scare
<	< 0.34	<11	> 0.017	< 0.20	71.5	>42 mpii	> 35 ropli	V30 Hg/s	>35 ⊞ph		<15	<1.5
Ð	≥ 0.56	518	> 0,R33	₹0,47	81 V	V34.150	> 28 mmlt	> 24 mpa	142 KZ <		52.5	<2.5
٥	< 0.76	≥20	> 0.750	89'0>	> 26	>27 uppli	> 22 mph	> 18 Appli	170 ZZ <		35	<3.5
Д	20.00	<35	> 0.667	\$2 0 V	2E >1	>21 mph	> 17.copl	> 14 topb	17 upd		×65	545
2	×1,8	<45	> 0.583	Ø.  ∨	¥	10m9t <	> 13 reph	> 10 mph	> 13 mp/t		<5.5	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
F	7 1.00	> 45	< 0.583	>1.00	14<	i/dm 9] ≥	ldm €i ≥	10 mpt		V 80 800	>5.5	>5.5
/c=Do	unand to Co	pacity Ra	tio	% FFS =	Percent Fre	6 FFS - Percent Free Flow Speed		ATS=	ATS - Average Travel Speed	peed		02/22/0

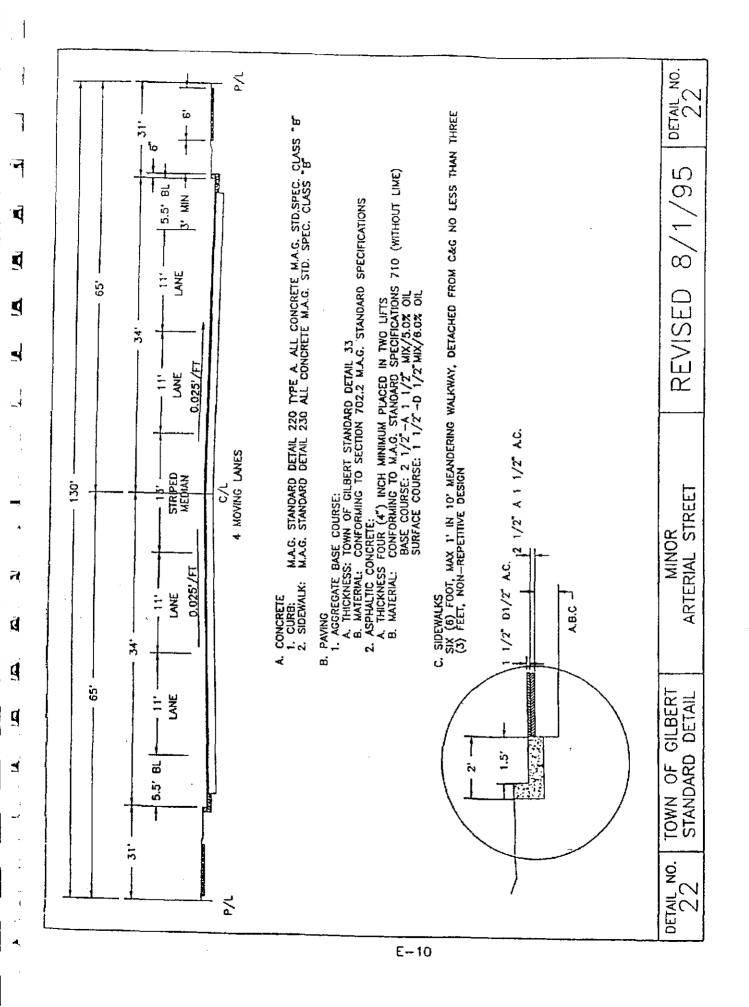
### APPENDIX F:

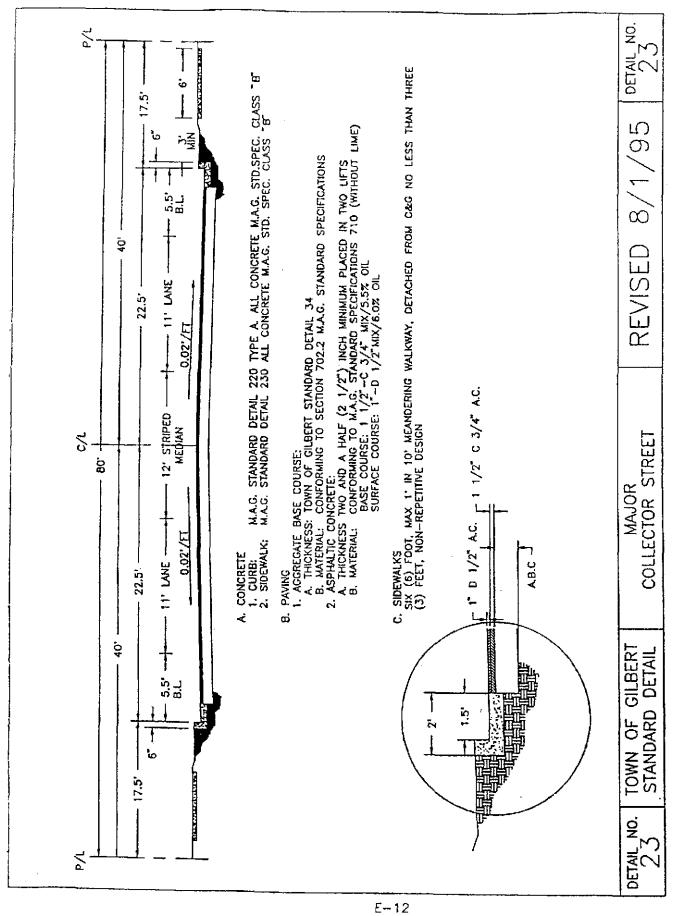
4

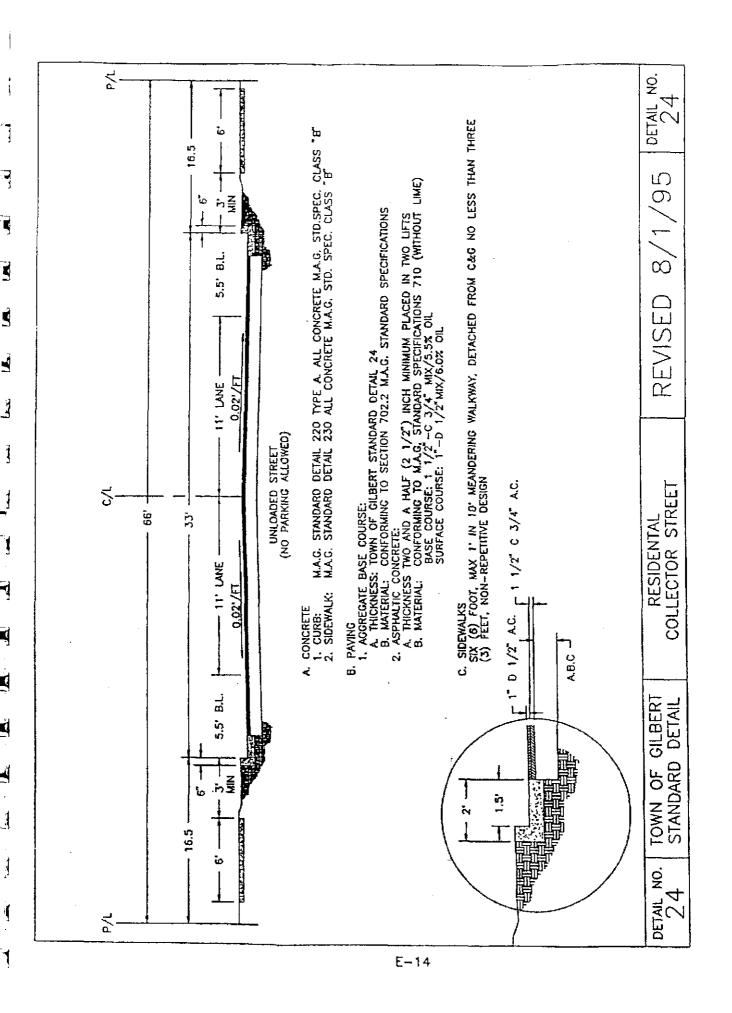
₫

TOWN OF GILBERT STANDARD CROSS SECTIONS









### **APPENDIX G:**

TOWN OF GILBERT COMMENTS AND RESPONSE MEMORANDUM



3707 North 7th Street • Suite 235 • Phoenix • AZ • 85014

Phone: 602 • 277 • 4224 Fax: 602 • 277 • 4228 e-mail: task@taskeng.net

November 7, 2006

### **MEMORANDUM**

TO:

Ų

Rick A, Town of Gilbert

FROM:

Ken Howell, P.E.

### RE: Response to Comments on Cooley Station Village Center & Business Park

The following summarizes responses to each comment made by the Town of Gilbert dated September 15, 2006, concerning the Cooley Station Traffic Impact Study, dated August 16, 2006. These responses have been incorporated into this final revised traffic impact study. Each comment is listed verbatim followed by a summary of how the comment is addressed or is incorporated into the final report.

1. Report should indicate that trip generation, trip distribution and level of service are to be performed in accordance with the Institute of Transportation Engineers Trip Generation Manual 7th Edition and the Maricopa Association of Governments publications. The traffic stop sign and signal warrant analysis are to be performed in accordance with the Arizona Department of Transportation policies and the Manual on Traffic Control Devices.

The source for trip rates in this study were *Trip Generation, Seventh Edition*, 2003, and the *Trip Generation Handbook*, 2nd *Edition, June 2004*, published by the Institute of Transportation Engineers (ITE). The site trips were distributed proportionally to the sum of Year 2020 population and employment forecasts within ten miles of the center of the site. The projections used for the trip distribution were obtained from Year 2020 Population and Employment projections by the Maricopa Association of Government (MAG).

For Year 2025, critical intersections were analyzed using the methodologies presented in the *Highway Capacity Manual*, 2000 Edition and were evaluated using the *HCS*+ software. This is a standard software package used analyze both signalized and STOP sign controlled intersections. According to the information provided by McTrans, the developers of HCS+,

"The Highway Capacity Software (HCS) is developed and maintained by McTrans as part of its user-supported software maintenance as a faithful implementation of the Highway Capacity Manual (HCM) procedures... The Highway Capacity Manual (© 2000 National Academy of Sciences) is the basis for all capacity and level of service computations included in HCS.... The Manual on Uniform Traffic

4

U

Control Devices (MUTCD) is the basis for all signal warrant computations included in HCS."

For Year 2015, generalized average daily traffic (ADT) analysis was completed to determine the estimated number of lanes and level of service. These daily service volumes were taken from Table 4-2 of *Quality/Level of Service Handbook*, prepared by State of Florida Department of Transportation, 2002. The <u>Transportation Impact Analysis for Site Development</u>, An ITE Proposed Recommended Practice, refers to the Florida Department of Transportation method as an example of a planning level analysis for determining level of service.

The Maricopa Department of Transportation (MCDOT) procedures for determining if traffic signals are warranted on the basis of estimates of average daily traffic (ADT) were used. These procedures convert the major eight hour volume warrant of the Manual on Uniform Traffic Control Devices (MUTCD) into estimates of daily traffic, as appropriate for comparison with the daily traffic forecasts prepared for this report. The procedures and recommendations are discussed in the SIGNAL WARRANTS section that has been added to the revised report.

All procedures used in this report are standard, state of the practice procedures for the completion of traffic impact studies.

2. Page 3, 2nd line, the phrase "located south of Recker" should state "located south of Ray Road".

This has been changed in the revised report.

3. Page 16, figures 5-1 and 5-2, turning movement counts are missing from turning movement diagrams A,B,C,D,H,I,N and S. In addition figures 5-1 and 5-2 do not identify the year for the Peak Hour Study Area traffic.

The study area traffic identified on Figures 5-1 and 5-2 are for full buildout of the site. This is used for both the Year 2015 and Year 2025 total traffic volumes, as this represent the ultimate amount of traffic generated by the development. Based on this, a year is not indicated on the Study Area Traffic graphic.

The turning movements on Figures 5-1 and 5-2 are for traffic traveling to and from the developments located in the study area. Traffic traveling through the study area that are not traveling to a site within the study area are not included in these turning movements, but are reflected in background traffic volumes. Therefore, some turns may be zero at some intersections in Figures 5-1 and 5-2. This issue is discussed further in response to Comment 4 below.

4. Page 25, figure 11-1, turning movement counts are missing from turning movement diagrams B,C,D,H and I.

3

De minimus turns were added to the total traffic in locations where low (or no) turning movements were projected. The intersections in diagrams B, C, D, H, and I on Figure 11-1 have been adjusted to add these de minimus turns. This represents minor turning movements, of 5 per hour, or 2 per hour for low volume intersections.

5. Page 31, under Traffic Signals, Williams Field Road and access 1 and Williams Field and access 2 are identified as being recommended for traffic signals, however, they are not identified on page 27, figure 12 where all other signal recommendations are identified.

Traffic signals are recommended at Williams Field Road/Access 1 and Williams Field Road/Access 2 for Year 2025. Year 2025 recommendations are shown on Figure 13-1 and 13-2. Year 2015 recommendations are shown on Figure 12.

The SIGNAL WARRANT and RECOMMENDATION sections have been revised to clarify the recommendation year for the signals.

6. Page 31, although this page identifies where right-turn deceleration lanes should be provided it does not address where dual left-turn lanes may need to be provided.

Dual left turn lanes have not been recommended for any intersections analyzed in this report. The graphics have been updated to reflect this.

7. Page 32, under the heading Year 2015 conditions, the last bullet states that warranted traffic signals for 2015 are shown on figure 8, however, it is shown on figure 12.

This has been changed in the revised report.

8. Page 32, under Year 2025 conditions the last bullet states that Power Road and Ray Road are recommended for 6 lanes for the year 2025. The study should indicate that this is per the Towns standard since the study data may not support the 6 lanes.

This has been added to the above referenced recommendation in the revised report.

9. Page 33, under traffic signals recommended locations, please see comments in 5 above.

The SIGNAL WARRANT and RECOMMENDATION sections have been revised to clarify the recommendation year for signals.

I hope this addresses the remaining issues regarding this report. If there are any further comments, or if I can be of any further assistance, please contact me at (602) 277-4224, or khowell@taskeng.net. Thank you.

H:\JobFiles\2302.04\2302.04A\Response to Comments 2302.04A.doc

# TOWN OF GILBERT - TRAFFIC ENGINEERING REVIEW COMMENT SHEET

Project Name:
Cooley Station Village Center & Business Park
Location:
Williams Field and Recker
Consultant:
Plans Sealed By:

Cooley Station Village Center & Business Park
Williams Field and Recker
Reviewer:
Rick A
Phone No.:
6841
Review No.:

Sheet Number	Summary of Redline Comments	Consultani Reply
	Traffic Impact Study	
	<ol> <li>Report should indicate that trip generation, trip distribution and level of service are to be performed in accordance with the Institute of Transportation Engineers Trip Generation Manual 7th Edition and the Maricopa Association of Governments publications. The traffic stop sign and signal warrant analysis are to be performed in accordance with the Arizona Department of Transportation policies and the Manual on Traffic Control Devices.</li> <li>Page 3, 2th line, the phrase "located south of Recker" should state "located south of Ray Road".</li> <li>Page 16, figures 5-1 and 5-2, turning movement counts are missing from turning movement diagrams A,B,C,D,H,I,N and S. In addition figures 5-1 and 5-2 do not identify the year for the Peak Hour Study Area traffic.</li> <li>Page 25, figure 11-1, turning movement counts are missing from turning movement diagrams B,C,D,H and I.</li> <li>Page 31, under Traffic Signals, Williams Field Road and access 1 and Williams Field and access 2 are identified as being recommended for traffic signals, however, they are not identified on page 27, figure 12 where all other signal recommendations are identified.</li> <li>Page 31, although this page identifies where right-turn deceleration lanes should be provided it does not address where dual left-turn lanes may need to be provided.</li> <li>Page 32, under the heading Year 2015 coditions, the last bullet states that warranted traffic signals for 2015 are shown on figure 8, however, it is shown on figure 12.</li> <li>Page 32, under Year 2025 conditions the last bullet states that Power Road and Ray Road are recommended for 6 lanes for the year 2025. The study should indicate that this is per the Towns standard since the study data may not support the 6 lanes.</li> <li>Page 33, under traffic signals recommended locations, please see comments in 5 above.</li> </ol>	
	·	
ħ.		Į.

1

# APPENDIX H: SIGNAL WARRANT PROCEDURES

### ENGINEERING DIVISION

### TRAFFIC ENGINEERING BRANCH

### MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

### Policy/Procedure Guideline

SECTION 4:

Traffic Signals

SUBJECT 4.6:

Evaluation of Future Traffic Signal Needs

EFFECTIVE DATE:

April 30, 1997

PARAGRAPH:

- 1. Purpose
- Description
   Exhibits
- 4. Background5. Authorization
- 6. References
  7. Attachments

### 1. PURPOSE:

This PPG sets forth the procedure and criteria to be used in evaluating future traffic signal needs on projects in the Capital Improvement Project (CIP) program, or in any studies undertaken by or submitted to MCDOT.

### 2. DESCRIPTION:

ADT volume warrant. This warrant applies at a new intersection, an intersection revised by a proposed roadway construction project, or at the driveway of a new commercial or residential development, and is met when the following requirement is satisfied:

The estimated ADT on the major street and on the higher volume minor street or driveway approach to the intersection equals or exceeds the values in the following table:

	Moving Traffic on h Approach	Estimated ADT	
Major Street	Minor Street	Major Street	Minor Street
1	1	10,000	3,000
2 or more	1	12,000	3,000
2 or more	2 or more	12,000	4,000
1	2 or more	10,000	4,000
1	1	15,000	1,500
2 or more	1	18,000	1,500
2 or more	2 or more	18,000	2,000
1	2 or more	15,000	2,000

Based on the volumes projected to be present within 5 years of the completion of the roadway project, commercial development, or 5-year horizon for Category II, III, and IV developments as per MCDOT Traffic Impact Procedures.

### 3. EXHIBITS:

d

None.

### 4. BACKGROUND:

There is a need for uniform and consistent criteria to be applied in evaluating the need for future traffic signals on various types of projects done by MCDOT or submitted to MCDOT for review. Establishing such criteria will assist consultants, developers and MCDOT in the development and review of future traffic signal needs on these projects.

### 5. AUTHORIZATION:

By the direction of the Manager, Traffic Engineering Branch, Engineering Division, Maricopa County Department of Transportation.

### 6. REFERENCES

Manual on Uniform Traffic Control Devices (MUTCD), current MCDOT edition Traffic Impact Procedures, February, 1994.